The Builder.

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The Preservation and Purity of Iron.

BUT few subjects connected with the craft of the builder, the work of the mechanical engineer, or the labour of any workman who is concerned in the manufacture or the preservation of ironwork, have more importance than the question, "What is rust?"

"Why, every one knows what rust is," many a reader may reply. "It is impossible to read any work touching on the subject, without becoming aware that rust and oxide of iron are used as equivalent terms."

Such, no doubt, is the general view; but the use of language, however general, is by no means a proof of the accuracy of the statement (the truth of which is taken for granted), that the destructive action which we call rusting is nothing else than the oxidation of iron by exposure to damp and to the atmospheric air; or, in other words, that rust *is* the oxide of iron.

It is obvious at a glance that this is not a mere curious question of speculative chemistry. It is not a pedantic quarrel about words. Rust, whatever may be the etymological affinity of the word written in Latin, *rubigo*, is good, plain, vernacular English. We all know what the word means, to a certain extent; and we all of us have more or less suffered from the liability of ironwork to be deteriorated by its attack.

But the main importance of knowing what rust actually and chemically is, is not literary. It is eminently practical; for thus alone can we arrive at the answer to the yet more urgently practical question, "How shall we preserve iron from rust?" If we mistake the nature of the evil, we shall not be unlikely to mistake the nature of the remedy.

Before entering into the investigation of any chemical hypothesis on the subject, let us call attention to the result of an experiment made recently by an eminent chemist, with a view to determine the nature of the action which generates rust.

Two pieces of soft iron, of equal dimensions, were filed up smooth and bright. A solution of bicarbonate of soda was placed in a test-tube. A portion of the same bicarbonate was placed in a crucible, and subjected to a heat which rendered it caustic, and a solution of this caustic soda was placed in a second test-tube. One of the pieces of iron was placed in each tube. The first of these, that placed in the ordinary solution, instantly began to rust, and continued to evince the active progress of that destructive process. The latter remained quite bright.

It was left in the solution for about six months, towards the close of which period it began to show symptoms of chemical action, and finally rusted like the companion specimen.

The cause of the behaviour of the iron in each instance is made perfectly intelligible on the theory that the red, destructive rust is not, as ordinarily imagined, an oxide of iron, but a carbonate of the sesqui-oxide ($Fe_2\ O_3\ CO_2$). On this view the presence of carbonic acid is necessary for the production of rust. The bicarbonate solution (Na. O. 2 $C.O_2$), was readily decomposed, and set at liberty the carbonic acid and oxygen to attack the iron, which, accordingly, immediately began to rust. But when this equivalent was driven off by heat, the iron placed in the caustic solution was not in a position to attract carbonic acid, and therefore did not rust. Its freedom from destructive action continued until the solution, being left in an unstoppered tube, had attracted enough carbonic acid from the atmosphere to lose its causticity. The moment that enough carbonic acid had been absorbed by the solution for it to *spare* some for the iron, rusting commenced. The experiment is extremely elegant, and it is difficult to resist the inference which is drawn from its results.

The view that the corrosive rust of iron is, like that of copper, a carbonate, accounts very clearly for the destructive action which takes place when iron is set into stone work, or in any way wedged into buildings surrounded by mortar. The chemical change which takes place in the drying and hardening of mortar is, after the first short period of setting, extremely protracted. During the whole of this slow process carbonic acid is at liberty to attack the inclosed iron, and hence arises that thickening sort of rust which, almost as if with the growth of vegetation itself, slowly and irresistibly acts as a destructive wedge.

Iron may, however, be used in the interior of buildings with perfect safety, if it is protected from the access of carbonic acid. A remarkable instance of this occurred, as a piece of practical experience, on the demolition of the Wriothesley-street Bridge, on the London and Birmingham Extension Railway. This bridge was erected in 1835. Like the Hampstead-road and the Park-street bridges, it consisted of brick abutments, pilasters, and piers, supporting cast-iron girders, between which were brick segmental arches, *set in Roman cement*. On the pulling down of this bridge for the extension of the Euston Station, it was found extremely difficult to separate the brickwork from the girders. It was as easy, or more so, to break the bricks themselves. But when the separation was effected, it was found that this unusual adhesion was caused by the entire *absence* of rust. The blue scale remained uninjured on the face of the metal,—red incrustation there was none. This blue scale, no doubt, *is* the oxide of iron, which forms, as in the case of other oxides, a coating of a protective character. The confusion of this harmless oxide with the destructive carbonate is an error of no trivial importance; and its detection bids fair to lead to the reconsideration of the entire subject of the protection of ironwork from rust.

Closely connected with the question of the action of carbonic acid on iron is the investigation of the facts, which at present seem to be so anomalous, observed as to the intimate union of carbon and of iron in cast iron and in steel. Why the elimination of a small proportion of carbon from the metal (or alloy) should be accompanied by such an increase of power of resistance to tensile strain, and why the reintroduction of a yet smaller proportion should be attended by so much more considerable an increase, is a mystery of economic metallurgy which it is of extreme importance to solve. The entire question of the behaviour of steel is one requiring much elucidation.

That steel, under certain conditions, evinces a metallic tenacity, and power of resisting fracture, of the very highest degree, is evident from the effect of impact on steel shell, when fired at armour plate. The action of that sudden and terrible blow, which shatters the case-hardened iron shot, is like that of the blacksmith's hammer on a bar of cold iron, dexterously manipulated on the anvil. We know that iron can thus be hammered till it is hot. The steel shell, in like manner, is heated until it actually explodes its contents. At the same time the head of the projectile is hammered out of shape; but no fracture takes place. The tremendous force of the blow seems to be converted into thermometric, or rather pyrometric, heat; and the steel, thus heated, forges as beneath the steam hammer. The property of steel shell was discovered by accident, a fuse having been picked up on the practice ground when there had been no blind shell fired; but, thus discovered, it has been made use of for the purpose of exactly timing the explosion of the projectile.

On the other hand, we have the fact that a steel armour plate, prepared with the utmost care for the purpose of experiment, tempered in oil and produced with the full expectation that it would evince a power of resistance never previously developed, was fractured, and speedily put *hors de combat*, by the comparatively trifling assault of a 68-pound shot. This difference in the behaviour of steel as hammer and as anvil, as projectile and as armour plate, *is*, as yet, entirely unexplained.

The interest of these inquiries is not merely philosophical. It is practical in the highest degree. So long as we are aware of the existence of facts, quite unexplained, but in which the most (apparently) inadequate causes produce the most extraordinary results, we are in the position of people who are on the brink of a discovery. How brilliant that discovery may be, we cannot tell. We are on the scent of a treasure trove, but we can only guess at the size of the crock of gold. Mankind has made use of iron for at least four thousand years, for fragments of iron tools have been found in the Great Pyramid, left by the original builders. How long was it before iron was turned into steel? And, even at the present day, while producing iron by millions of tons, and paving our railways with steel, we are discussing the chemical action which produces rust, and we are entirely ignorant of the intimate cause of the differences between iron and steel, so far as regards the effect of the dose of carbon.

It is stated by Sir W. Armstrong that both in the Elswick and the Woolwich guns, whenever failure takes place, it almost invariably originates in the part which is made of steel. The steel tube is the part that cracks first. Steel vent pieces, which were first employed, were fractured with alarming frequency; but since iron ones have been substituted, fractures have been rare. It is argued from these facts that the vibratory action attending concussion is more dangerous to steel than to iron.

The peculiarity of the case consists in the apparently contradictory behaviour of steel when used as a projectile, as a gun, and as a target. It is quite true that, in all manufactures of iron, the two opposite qualities of hardness and of toughness have to be considered. We are not so ignorant of the practical part of this branch of metallurgy as to be unaware of modes of tempering, and of annealing, and generally of producing a metal suitable to the purpose in view. But what we do *not* understand is the law which regulates the existence of these properties. Our knowledge on the subject is almost entirely empirical. The tensile strength of wrought iron is considered to be due in great measure to the removal of the 4 or 5 per cent. of carbon which is contained in cast iron. The formation of laminated fibre by hammering, no doubt, has much to do with the change; but the chemical difference is important. Yet when iron is made into steel, the tensile strength of the latter is increased by the addition of carbon up to the proportion of

some 1¼ per cent. With this very increase of tensile strength, however, contrary to all analogy, we find an increase of brittleness to coincide. For resistance to impact it is considered that steel cannot contain too little carbon. That hardness and brittleness should increase or diminish together is not matter for surprise; but analogy would lead us to expect a different result to accompany the increase of tensile strength.

There is no doubt whatever that the great foe to the excellence of iron is impurity, especially the presence of sulphur. Our enormous production, and the commercial rivalry which has proved so strong a temptation to the manufacturer to study cheap modes of production, irrespective of their influence or quality, has deteriorated our iron to a lamentable extent. English axes are said to be useless in the forests of America, or against the iron-barked trees of Australia. The difficulty of producing, from the present wrought iron of commerce, anything approaching the excellence of the old English forged work, has been illustrated, within the past few months, by the high praise given, by very competent judges, to some specimens of smiths' work to which prizes were awarded by the Society of Arts the other day. If these prize specimens be compared, not only with the Hampton Court gates, forged in 1695 by Huntingdon Shaw, and preserved at South Kensington, but with such samples of neglected and unknown old English work as may now be seen in the course of rapid decay before an old house in the main street of Rochester, we cannot fail to deplore a sad decadence in the art; the fault, no doubt, as well of the iron-master as of the smith.

It would probably be impossible for any English smith now to produce such work as some of the later specimens of articulated armour in the Tower of London. On the other hand, where, for special purposes, special attention has been given to the manufacture of the iron, the result is satisfactory. We question whether either Toledo rapiers or Damascus sabres would stand uninjured, taking them one with another, the rude tests to which Mr. Wilkinson, of Pall-mall, subjects his best swords. It is true, that of these carefully-made blades, we have seen three out of four damaged in the test. But the *one* which passes is a weapon to which a man may safely trust. If any corslet now worn in European warfare resists its thrust, it is the fault, not of the blade, but of the arm that wields it. In preparing iron for special purposes, the chemical character of the water used in the factory appears to be very important. It was an old bye-word in the steel trade that a good sword could not be made at Sheffield, nor a good knife at Birmingham, the sword being the boast of the latter town, and the knife of the former.

The practical upshot of these considerations ought to be, the concentration on the subject of the chemical properties of iron and carbon in combination of the same kind of clear, patient, purposed attention as that which has thrown so much light, within the past few months, on the question of the propagation of disease by germs floating in the air. An immense amount of empiric inquiry is going on upon the subject. Great practical results have been attained. We need not particularise any of those processes as to which no small amount of controversy has recently raged. We are not undervaluing the labours of such men as Whitworth, Brown, Siemens, or others. Still, while the action of carbon in its relation to iron is so apparently capricious and contradictory, and while the destructive effect of carbonic acid, and the actual nature of corrosive rust, have been hitherto, almost entirely, unsuspected, we cannot doubt that a great reward, in fame at least, if not in gold, will attend the success of that scientific investigator who shall unveil the true law of the relation which subsists between the material which forms the hardest and the most precious of gems, and the mineral which, all things considered, may be pronounced the most valuable of metals. The Victoria cross of science awaits the discoverer of the law of the combination of carbon with iron. The fact that the presence of phosphorus produces "shortness" or brittleness in iron when cold, while that of sulphur has the same effect at a red heat, is another of those anomalous and apparently capricious differences which chemistry has detected, but not explained.

Very closely connected with this part of the subject is the extremely important question of the influence of mineral or of vegetable fuel on the reduction of iron ore. So far from this being a mere matter of chemical curiosity, it is one which is most intimately connected with our natural prosperity. It is well known that iron was originally smelted in England by wood, and that, under these circumstances, beds of iron-stone, which are now entirely neglected, in consequence of their distance from the great coal basins, were advantageously worked. In the present state of the country, of course, no fuel can be obtained except coal. In 1866, it is estimated by the Mining Record Office, 9,665,000 tons of iron ore were raised, and 4,530,000 tons of iron were produced, in the United Kingdom. The quantity of coal consumed in the 613 blast furnaces which smelted this total quantity of pig-iron is not stated. The total quantity of coal raised in the year 1866 is set down at upwards of 101,500,000 tons. The iron made in England at present, — or, at least, in 1866, — was very nearly half the total make of the world, which is estimated for the preceding year, 1865, at nine millions and a half of tons. We shall probably be under the mark in setting down 15,000,000 of tons of coals as consumed in our smelting furnaces. The average value of English coal, at the pit's mouth, is taken by the Mining Record Office at 5s. per ton, which would give something like 15s. for fuel for smelting a ton of coal.

In Russia charcoal is still almost exclusively used for smelting; and as to the superior quality of the iron thus produced there is no question. Nor as to the mere element of the cost price of production is the difference so much in favour of the inferior quality of metal as to lead us to entertain any very great confidence as to the permanent position which our iron-masters will occupy in Europe. From recent and very carefully-collected information as to Russian iron works, we find that iron is now produced by the consumption of 110 tons of charcoal to 100 tons of iron made. The lowest price of birch charcoal in Russia is 6s. 6d. per ton. 8s. 2d. per ton is considered a cheap purchase; and 14s. 9d. per ton, and even more, is paid in some establishments. As this variation in price, however, is almost all due to the expense of land-carriage, there can be no doubt that the service of the great iron-works by light railways, which can be laid and relaid year after year to the portions of the forest from which the supply is taken (on the principle of allowing from sixty to eighty years for the regrowth of the timber), will keep down the cost of charcoal for smelting to something below 10s. per ton of iron.

We have not space to exhaust this important subject at present. One thing seems to us to be clear, and that is, that unless the attention of our practical and scientific chemists is turned to the purification of iron smelted by mineral fuel, to the elimination of sulphur and other impurities, and to the elucidation of the complete scientific theory of the relations existing between iron and carbon, the time cannot be far distant when our blast furnaces will be blown out one by one; and when the excellent charcoal iron which Russia can produce in any quantity, and at moderate prices, will replace Scottish, Welsh, and English metal in the market of the world.

THE ARCHITECTURAL EXCURSION IN LINCOLNSHIRE.

"A CITY that is set on a hill cannot be hid," is a sentence that involuntarily suggests itself on first coming in sight, from the railway, of the three towers of Lincoln, which, from their lofty position, dominate the whole country round. The cathedral, in fact, occupies nearly the whole of the level ground on the eminence on which it stands, the ground sloping away from the building, more or less, in every direction, and the principal ascent to it from the south (the railway side of the town), appropriately labelled "Steep-hill," constituting such a climb as might have suggested to John Bunyan, had he ever visited it, the idea of the "Hill of Difficulty" on the road to the "Celestial City." In the projected tour of the Architectural Association, among the Lincoln churches, under the guidance of Mr. E. Sharpe, the cathedral naturally presented itself as the starting-point, and accordingly the excursionists were invited to meet their accomplished guide, in the first instance, at the Lincoln Assembly Rooms, to hear an introductory lecture on the Cathedral, as well as on some of the general points to be noted in connexion with the architectural style and development of the buildings to be visited during the tour. Accordingly, at two o'clock on Monday afternoon, there did duly meet there some thirty-five or so of architectural students and aspirants, after some "speering" on the part of stragglers as to the whereabouts of the meeting, the inhabitants of the good town appearing to be happily ignorant of their own valuable institutions, or else those of the "lower" town knew nothing of the cunning of the "upper." Besides the professional audience, there were present both at this and at the evening lecture, the Bishop of Lincoln, several of the neighbouring clergy, and a fair sprinkling of ladies. The main part of Mr. Sharpe's lecture on this occasion, as far as regarded the history of the cathedral, had been before delivered in Lincoln, and a full report of it appeared at the time in our columns. Thus it is unnecessary, therefore, to recapitulate; suffice it to say that it was listened to with much interest by those present, illustrated as it was by a large geometrical drawing of the building, coloured so as to distinguish at a glance the dates and chronological order of the various portions. It is worth repeating as a hint to those who are aware of the value of order and system in carrying on a study, that Mr. Sharpe has for many years past employed a regular scale of colour for marking, in illustrative drawings, the period to which each part of a building belongs; this is based on the prismatic spectrum, the colourless (or black) band exhibiting the starting-point before any style could be said to be matured, the colour progressing in brilliancy through green up to yellow, which marks the completely developed Early Decorated or (as Mr. Sharpe, like ourselves, prefers to call it) Geometrical period, and then declining through orange (the later more florid Gothic) to the final resumption of neutral tints. The large number of drawings exhibited on the occasion (including a very valuable and comprehensive chronological progression of the mouldings typical of various periods) were thus at a glance classified by the spectator, with more ease than perhaps any other method would have furnished. One or two special points touched on in the course of the lecture we may draw attention to for the benefit of students who were not present. In the Transitional period, from the round to the pointed arch, it was observed that (in the earlier period of transition, at least) the pointed arch was always employed constructively; the round arch decoratively. This view of the subject, very decisively insisted on by the lecturer as the result of observations of many buildings (Continental as well as English), is another contribution to the theory of the almost purely constructive origin of the pointed arch, already based by other able critics on an examination of the development of groined vaulting, and can alone explain the anomalous style of such a building as Kirkstall, which appears externally as a Norman, internally, in its main features, as a Gothic building. The quasi-classical but *inverted* volute at the angle of the capital was also alluded to as a unique feature of the Transitional period, existing almost simultaneously over the whole area where the style was practised, but for a very limited period only. In adverting to the fine and effective sections of the arch-moulds and vaulting ribs of the cathedral, Mr. Sharpe took occasion to repeat, even more urgently, his protest, recently printed in the *Builder*, against despoiling such mouldings of their natural effect of light and shade by the reckless application of colour; a caution which was received with applause by the professional portion of his audience. In the evening the same audience assembled to hear some remarks by Mr. J. H. Parker, chiefly directed to proving that the Early Pointed work in Lincoln Cathedral was the earliest example of that style in existence, and preceded the similar work at St. Denis, usually ascribed to the Abbé Suger, but which, he contended, had been rebuilt later than the time of that ecclesiastic. The main object was to affix the honour of having invented the pointed style to an English instead of a French builder, in connection with which some question was raised as to Bishop Hugh's architect at Lincoln and his French name (Geoffrey de Noyers), though it appears both possible and probable that the name might have been borne as an English name for two or three generations previously. It would not be to the purpose to recapitulate here the arguments *pro* and *con* as to this subject, more especially as it is evident that an architectural movement

so extensive, and yet so gradual as that which developed the pointed arch cannot, at this distance of time, ever be conclusively fathered on any individual architect. A few words from the Bishop of Lincoln concluded the meeting, the right reverend speaker dwelling appropriately on the sense of tranquillity inspired by the contemplation of such ancient and noble structures as our cathedrals, in contrast with the stir of nations and possible overthrow of dynasties now disturbing the Continent, and urging also the necessity of using the cathedrals, not only as objects of architectural study, but as structures available for public worship on a grander scale than has hitherto been realised. Whether these noble edifices can thusbe made, permanently, of practical value to modern England, time must show.

Tuesday morning found a numerous party, architectural and amateur, assembled at the west door of the cathedral, to accompany their guide through the building. The survey was arranged, as far as could be, chronologically. The centre portion of the west front, containing the work of Bishop Remigius, is, as most persons know, the oldest part, and it is noticeable that this portion of the work, which looks as firm and solid as when first erected, is built with the thick mortar-joints, the use of which has been so advocated in our pages, and of late by others. The details of the centre doorway are of later date, and those of the north and south doors in the west front later still, though even the latter preserve the Norman character in general style, the progress of transition being only marked by the altered treatment of some of the characteristic Norman ornament, especially the interrupted zig-zag, where two parallel lines of zig-zag ornament dovetail, so to speak, into each other. Much correspondence and lamentation arose, some years ago, concerning the "restoration" of these doorways. The richly-carved shafts are nearly all restored work,—in fact, new shafts inserted bodily, but carved from old fragments; and in the south door, while one jamb has been entirely re-worked, the other, which was the best preserved, has been retained in its original state, as a proof of the fidelity of the restoration. From the east end we go, following the chronological order of events, to the choir of Bishop Hugh, or (as we should rather say), of Noyers, his architect, whose work may broadly be said to be included between the eastern walls of the two transepts, including, that is to say, the whole of the east transept, and one wall of the west transept. Nowhere perhaps could the history of the development of Early Gothic be better traced than in this portion of Lincoln Cathedral. The eastern transept is of the boldest and finest Early Gothic work, not without some strong French touches here and there, as in the position and plan of the apsidal chapels projecting from the east wall of the transept, and the plan of some of the principal piers in this locality, with their boldly projected disengaged shafts, connected, however, in this case with the main pier by a series of projecting curls or crockets partially filling up the gap between the centre column and shaft. Round great part of the east transept and the choir aisles adjoining, runs the splendid double arcade in the lower story of the wall, and in this and other specimens of wall-arcading in the immediate vicinity, can be traced all the stages of foliated carving, from the earliest rather stiff conventional foliage with its large round lobes (in the arcade aforesaid), to the perfection of free yet purely conventional Early English capital, and (in a screen wall between south aisle and choir) the near approach to *naturalism* in the richer but less entirely satisfactory decoration of the fourteenth century. Mr. Sharpe was consistent in his warnings to his younger architectural friends, more than once repeated, to avoid direct copying of natural foliage forms in stone, but always to conventionalise, as we have long taught. The search after architectural style is again exemplified in the almost wild irregularity of detail in the triforium, especially of this choir, where the tentative experimental attempts at what was afterwards to develop into geometrical tracery, are evident in the variously-shaped piercings in the spandrels of the arches, in many of which the sections of piers and arch-moulds, also, are much varied, as also the manner of introducing and grouping the Purbeck marble shafts, so profusely employed in this part of the building, as if the architect were determined to try all methods of obtaining a piquant effect. This irregularity in smaller matters, shown also in the curious arrangement of the vaulting surfaces at the eastern crossing, where the centre of the vault is by no means in the centre of the plan, and in the fact that the axis of the choir and nave is not strictly in a line, is the more striking in a cathedral which conveys to superficial observation such a general impression of completeness and comparative uniformity. In the west transept the work of Bishop Hugh comes to an end in the east wall, about two-thirds of the distance from crossing to the south front of the transept: here, though the main design is continued, a marked alteration and attenuation of the arch-moulds in the wall-arcades shows where the work had ceased for a time (possibly from deficiency of funds), and been again resumed some twenty or twenty-five years later. In the upper portion of this transept is (on the south face) the well-known Late circular window, so often engraved; and on the west side of the transept the south porch, so perfect and rich a specimen of the late "lancet" style, offered more for admiration, though less for comment, than almost any other portion of the building. In the north transept the singular effect produced by the line of the northernmost vaulting-rib falling *below* the lines of the circular-plate tracery window drew from Mr. Parker the suggestion, almost amounting to assertion, that the vault had been re-erected after the fall of the central tower, and rebuilt at a lower level than before. But there is no trace in the triforium story of such a disturbance as must have been caused by altering the level of the springing of the vault (though there is plenty of evidence of the attempt to strengthen the triforium after the catastrophe by casing the shafts, &c.); and, moreover, we discern, if we mistake not, a distinct flattening or rather depression of the crown of the round arch over the wheel window, where the longitudinal vaulting rib cuts it, which must clearly have been made at the time of building, in order to allow for some slight miscalculation as to the height of the centre rib. A question from a member of the party as to the structure of the nave between the ribs (where it is plastered over) was deferred for further consideration till the adjournment to the presbytery, where the vaulting surface is exposed to view. Before this, however, we diverge a little from our chronological path to consider the organ-screen, a monument of what florid late Gothic could achieve at its best. Every portion of this remarkable screen is covered with carving of the most elaborate and delicate description, the whole surface of the panels between what, if it were wood, might be called the "stiling," being completely carved into a diaper. Less richness might possibly be more effective, but it is impossible to be hypercritical before so perfect a specimen of a remarkable period of the art. Hence we repair to the presbytery, the "angel-choir" as it has been termed, from the figures of angels in alto-relief in the spandrels of the main arcade. In what abnormal fashion the east end of Lincoln Cathedral may once have terminated can probably never be known now; that it was abnormal is probable from the fact that the building was confined at the east end originally by the city wall which crossed at this point, and which was removed in 1256 by a special permission from the sovereign, in order to allow room for carrying out the present design. Standing under the roof of the presbytery, at any rate, as Mr. Sharpe observed, with an enthusiasm fully responded to by his audience, in the presence of "the perfection of Gothic architecture,"—in the face of this perfection, however, did doctors differ, and that materially,—and reverting to the question before raised, as to the treatment of interspaces of the vaulting, Mr. Sharpe, continuing his urgent and really almost solemn appeal to his young professional friends against the use of over-much colour, deprecated any decoration of the vaulting which would hide the masonic construction, and recommended leaving the vault surface untouched. To this responded Mr. Parker, that in his judgment all Gothic buildings not only had been entirely coloured internally, but had been designed by their architects with that view. Hence a tolerably animated discussion, majority resting apparently on the achromatic side; and opining that, granting undeniable evidences of colour, the said colour was not due to the original architect, but rather to ignorant hands defacing his work. Mr. Sharpe made a strong point in favour of this view by reminding his audience that in the Mediæval wall-paintings, such as are known, the architectural features (canopies, &c.) were almost always incorrectly drawn. Is it not, we may suggest, likely enough, that the same ecclesiastics who illuminated the Missals also illuminated the buildings in a similar style, either with their own hands or under their direction? *Au reste*, there is little need to dwell on beauties so well known as those of the Lincoln presbytery, with its exquisite triforium and east window, the perfection of geometrical tracery. In regard to the Purbeck shafts in the triforium, which have at some time been whitewashed over, a question arose how far the employment of those dark-coloured shafts was advisable in the centre of the opening against the dark shadow behind. A few of these shafts and capitals have been scraped and polished with a view to try the effect, but it must be admitted that the effect of those which are left white against the shadow is more satisfactory, if one could only forget that the effect was produced by whitewash. The monument and reliquary to the memory of the Burghersh family possesses both architectural and archæological interest, and is a type of a class of monuments not uncommon in great churches, which may be termed "Founder's monuments," and which, being commonly immediately subsequent in date to the building in which they are found, often afford very valuable illustrations of the change of style. An interest of another kind attaches to the monument recently erected to the memory of that excellent and hardly sufficiently honoured painter, William Hilton, born at Lincoln 3rd June, 1736: the monument is illustrated by bas-reliefs of some of his principal pictorial compositions. A point in the choir of Bishop Hugh, which we should have alluded to, is that the shaft in each pier towards the centre aisle (which goes up to form the vaulting shaft) has been cut away below to make room for the wooden stalls subsequently added, and terminated above by a corbel inserted; the effect is peculiar, and at first sight somewhat puzzling, giving as it does a much "later" outline to the plan of the pier. From the presbytery we reach the well-known cloister and chapter-house, with its central clustered shaft; and from the Dean's garden (through the cloister), into which the party were kindly invited, a fine and rarely-seen view of the north flank of the cathedral is obtained. It is a pity that the authorities of this splendid cathedral cannot contrive to have a musical service worthy of the edifice in which it is held; the effect of a small handful of not over good voices going sleepily through the Psalms to a nondescript chant furnishes but an ill omen for the promised "new life" which is to be brought into the cathedral system.

On the afternoon of Tuesday, the party visited two churches close to the town, St. Peter, Gowt's, and St. Mary-le-Wigford, in order to shorten somewhat the programme for the next day; passing on the way the bit of Norman building known as "John o' Gaunt's stables," and showing some curious and unusual incised ornament. In the first of the two churches mentioned there is nothing of very special interest; but let none of our readers visit Lincoln without seeing that of St. Mary-le-Wigford (close to the railway station), where they will find some of the most beautiful Early English work, in the shape of piers and capitals, which could well be met with; St. Peter's also can show an early pier, of good and unusual section, and with a very elegant base. The evening meeting at the Assembly Room, again attended by a considerable number of amateurs, was taken up by a very clear and concise exposition by Mr. Sharpe, of the history and genesis of Gothic mouldings in the various styles, illustrated by a number of full-size sections, a portion only of a very large collection, much of which is still unpublished. It was impossible to study this fine collection of mouldings without feeling how much architectural effect is, after all, independent of carved decoration—how much of really solid and beautiful masonic art is attainable by contrast of surfaces and shadows alone. Besides the ecclesiastical structures, there is little of architectural interest in Lincoln, either ancient or modern, worth going out of the way to see. One drawback to a residence here, the readers of recent numbers of the *Builder* will not be surprised to hear of, we counted, if not quite Coleridge's "two-and-seventy," at all events, "several" stinks peculiar to different parts of the town. How we visited the neighbouring churches, and what we saw there, as Spenser says, "if ye list, another rede shall tell."

PLEASING THE EYE.

Where art is concerned, the faculty of seeing becomes itself an art."—*Mrs. Jamieson.*

"The art of architecture does not consist in words; the demonstration ought to be sensible and ocular."—*Freart.*

The proverb, "If ignorance be bliss, 'tis folly to be wise," may occasionally be truthful; seldom, if ever so, in pleasing the popular eye by over-decorating buildings both public and private. There are two ways of pleasing the eye; one by crowding as much vulgar ornament upon the surface of a building as possible; and the other, by decorating an edifice with suitable cornices, mouldings, and superficial decorations, nicely distributed, so as to realise a well-balanced light and shade. When a building is covered with finery, in which our Continental neighbours indulge so largely, there is no contrast, no light and shade; a plain building is all light, and an over-decorated building is all shade.

A writer in 1736 observes "that folly in building is one of the most lasting reflections on a man's character, because it is not only universally known in his own time, but is often perpetuated through many generations." This proves the importance of entrusting works of architecture and sculpture to educated and careful hands; and he very properly continues that "true taste is not to be acquired without infinite toil and study; and we are generally too indolent to accept of an advantage on such terms. This is the real occasion why a false one is so apt to prevail, and, in a division of mankind, would number three to one in its own favour."

The powers of taste have been naturally uniform in all, but unfortunately these powers, in the bulk of mankind, have not been cultivated. The accomplished Claude Perrault, architect, of the seventeenth century, asserted that what is agreeable to the eye is not so, on account of its proportion, when the eye knows it not, as it very often happens.

Gerard, in 1780, says that incorrectness of taste may arise, either from the dulness of our internal *senses*, or from the debility of judgment.

As far as architecture is concerned, the eye must be educated. "Taste," says Jackson, in 1795, "is not a gift of nature, but an acquirement of art—nor is it easily acquired." Knight also, in 1806, perceived this, when he wrote that in a Grecian building, in which the relative proportions of the different orders of columns were not observed, a person skilled in architecture would instantly discover a want of symmetry, which, to another of even more correct taste, as far as correct taste depends on just feeling, may be utterly imperceptible.

Burke endorses the necessity of educating the eye, by considering that the principal causes of the difference of opinion among those who criticise in architecture, are owing to their different degrees of knowledge of the principles of the art; for critical taste does not depend upon a superior knowledge: it is the offspring of learning and a just education, and is always more or less within our power.

The ear is naturally pleased with simple melodies, and the eye with natural scenery; and as musical compositions of the highest mental class require an educated ear, so likewise do architectural and art compositions demand a cultivated eye. In the latter cases, which claim an extensive and profound knowledge of all the laws dependent upon good music, architecture, &c., a natural taste will fail in pleasing either the ear or the eye. When the painter pourtrays natural scenery, he pleases by copying nature; so likewise the sculptor, when he copies living forms; but the moment art steps in, and design and compositions are attempted, then education must be enforced. This subject has created more conflicting opinions among men of letters than any other, and is seldom clearly explained.

The infant, urges an essayist, when it first opens its eyes to the light, looks upon a world of wonders, and can form no correct idea of any object which it sees, until it has also touched and handled, tasted, or smelled it. The moral of all this is, that sight, like every other faculty, requires careful education, and the pitch of perfection to which it can be educated is truly surprising. Very seldom is it sufficiently and properly exercised. Most men walk about this beautiful and wonderful world as if they had a veil before their eyes; vision is to them but a half faculty, a dull, almost inert sense. Sir Joshua Reynolds says, that if a man born blind were to recover his sight, and the most beautiful woman was brought before him, he could not determine whether she was handsome or not. With all due deference to so able and distinguished a writer on art I differ *in toto;* no education being required here, the man would be as naturally charmed with the female form as he would be with a beautiful landscape. Nature acts in these cases, not art.

Cicero, speaking of the stateliness and magnificence of houses, urges that "there certainly ought to be some bounds fixed and prescribed to these things, and those to be according to the rules of moderation; but the measure whereby we are to judge of their being moderate is their subserviency to the ornaments of life."

In the ornamentation of a private mansion the owner can expend as much as he likes, although, morally speaking, he ought not to offend the eye even of the public. But it is a serious matter to expend the public funds in superfluity of decoration, and that for several reasons: the money might be more usefully expended in alleviating actual misery and want; the popular eye ought to be educated; and those selected to design public buildings ought to be capable of approaching the subject with a sound architectural knowledge, having respect for all that is good in precedent and antiquity: a mere decorator should never be employed.

In reference to educating the eye architecturally, the more the subject is inquired into the greater is the difficulty, and for this reason, that the buildings left us by the architects of Greece and Rome vary so much in their proportions, not in merely those appertaining to each edifice as a whole, as in the details. Architects have evidently been too timid with the classical remains of antiquity, hence the reason why architecture has been an exception to the law of progress.

It has been considered that the excessive respect architects have for the antique, takes its rise, as unreasonable as it is, from the respect which is due to holy things. To obtain a correct knowledge of the beautiful in art requires much study, as fashion, or custom, has sanctioned abuses which should be avoided. These have been pointed out by Perrault, Palladio, and others.

If the public eye were educated, architects possessing a correct knowledge of proportion would undoubtedly obtain more practice than those who, without that knowledge, please the uneducated eye, by employing artists to embellish their designs with natural scenery, landscapes, and all those charming accessories which are ever pleasing to the natural or uneducated eye. To the latter, an ill-proportioned building, say a church without a chancel, having a polygonal apse stuck against a cross church tower, or any other deformity, is rendered pleasing, but the educated eye is not misled because the critic, giving credit for the landscape, fails not to judge the design of the building upon its own merits. A good building with a bad landscape will receive censure, but an ugly edifice with a charming scenery will obtain a reward.

The young artist's mind must be educated through the eye; and, notwithstanding all that has been said by essayists against rules and systems, they are absolutely necessary in training the young mind. Rules and systems are little required by the advanced student. The architect and artist need not be modest in enforcing arbitrary rules to aid instruction, the more especially when we look around, and find the planets named after heathen deities, and the pretty simple flowers, so grateful and intelligent to the most childish eye, pourtrayed by the so-called scientific botanist with the most extraordinary complicated systems, of which Nature knows nothing. There is a fine opportunity for the astronomer and the botanist to simplify the whole, and render these beautiful studies more enticing and intelligent to the inhabitants of the world, instead of to a small class, at best but badly instructed in dead languages.

An educated man enjoys, through the eye, many pleasures that the vulgar are not capable of receiving; he can, as Addison says, converse with a picture, and find an agreeable companion in a statue.

I do not agree with Bacon, that houses are built to live in, and *not to look on.* An ugly building is offensive to an educated eye, and tends to demoralise civilisation. "If beauty," says Alberti, "is necessary in anything, it is so particularly in building, which can never be without it, without giving offence both to the skilful and the ignorant."

For pleasing the architectural eye there have been many suggestions and practical experiments. Knight ventured to build a house ornamented with Gothic towers and battlements without, and with Grecian ceilings, columns, and entablatures within. Fortunately, the public had better taste than the essayist, and did not follow his eccentricity, although he congratulated himself upon the success of the experiment.

Sulzer, in 1806, recommended the cube for small dwelling-houses, the adoption of which has unfortunately been, until recently, but too general, and disfigured both town and country with monotonous boxes, more useful than ornamental. The dwarf shrubberies added like whiskers, on each side, instead of relieving their appearance, made them more ridiculous.

The writers on taste of the eighteenth and early part of the nineteenth century had a certain distemper, neither mentioned by Galen nor Hippocrates, termed by Juvenal *cacoëthes scribendi*, and cited by Addison as a hard word for a disease called in plain English "the itch for writing." Had Freart been acquainted with these writers, he would have called them *cicaloni*, a term used by the Italians to designate "eternal talkers to no purpose." Of course there is a large amount of good common sense in their dissertations on moral beauties, but an ignorance of architecture is to be traced in all the essays. It would have been better if these amateur writers had not touched upon architecture, as it is a subject capable of exact demonstration, and ought not to be mixed up with sensations of the palate, dreams, sudden love, dancing, &c. I can understand an architect being versed in the manners, customs, and modes of life, but it surely is not necessary for him to be bored with the passions, however sublime and pathetic they may be. It would have been more edifying to the general reader, if these writers on taste had appended instructions in the art of cookery instead of their unmeaning comments on architecture, of which latter they knew nothing, having made unsavoury hashes of the subject.

The architect will find it by no means a waste of time to ramble over the past, and to detect the errors of the architects and essayists on taste during the past century; a study which will tend to induce him to think, and will not be found altogether unprofitable or uninstructive; on the contrary, it will lead him to correct his own professional judgment. Sir Joshua Reynolds was of opinion that the habit of contemplating and brooding over the ideas of great geniuses, until you find yourself warmed by the contact, is the true method of forming an artist-like mind; it is impossible in the presence of those great men, to think or invent in a mean manner; a state of mind is acquired that receives those ideas only which relish of grandeur and simplicity.

In conclusion, the eye should be taught to criticise correctly the various styles of architecture; all maxims and theorems studied relating to architecture proper; painters or picturesque architecture must be shunned, such as spiral columns, scooped pediments, Claude and Gaspar's mixtures of Grecian and Gothic in the same building; also French fopperies and decorations, with which Addison was so disgusted that he heartily wished there was an act of Parliament for prohibiting their importation. The observer must remove from his mind all felicities of real genius, sensations, feelings, affections, emotions, and romantic dreams. Without a correct knowledge of all that is good, and what to avoid, the critic's "fire of criticism" is mere smoke.

W. Pettit Griffith, F.S.A.

MODERN ARCHITECTURE IN INDIA.

A lecture on Architecture delivered in India by Lord Napier includes passages which will interest many of our readers. After urging that in selecting materials the architect should consider two things chiefly;—1. The sources of supply; and 2. The object of the structure, Lord Napier proceeds:—

If the rules concerning material which are here enunciated are correct, I need scarcely say that they are in every respect so violated in India on every hand as to rouse the regret and condemnation of all reasonable critics, and to make the virtuoso weep. Madras is the epitome of every error that architecture can commit with reference to material. Look at the Railway Station, the High Court, the Custom House, the sea front of the Fort buildings, all discovering the same shameful condition of chronic disfigurement and decay, all blistered, discoloured, and crumbling, the victims of an unequal strife between the elements and stucco. Yet at no great distance there are inexhaustible supplies of the

finest stone, and the very soil beneath our feet teems with clay which only requires the skilful exercise of a familiar art to yield qualities of brick and terra cotta competent to resist the attacks of the blast and the spray for ever. The Presidency College and the Sailors' Home are the first attempts to build in an honest manner with undisguised materials, but the art of preparing them is not attained in a day, and I fear that we can scarcely regard these buildings otherwise than as the forerunners of a better era.

I turn my eyes with satisfaction from our own misdeeds to the more attractive errors of our neighbours. Two considerable buildings have been recently erected under English impulse and superintendence in two Native States. I speak of the Public Offices at Bangalore and the Public Offices at Trivandrum. Both countries possess peculiar materials in the highest perfection, and both were in possession of ample financial means. Mysore is the region of granite. Travancore is the region of wood.

At Bangalore it is natural to suppose that in a great public building the plain external walls would be constructed for cheapness and variety of colour of substantial, well-prepared, well-tinted brick, while the columns, corners, entablatures, and cornices would be composed of grey granite, which is procurable with the greatest facility and at comparatively little cost. A more natural, more beautiful and durable combination could scarcely be conceived. But not at all. Instead of this, you have an immense, well-distributed, and useful pile, constructed of materials too perishable to remain uncovered, so that the whole edifice is cloaked in cement of a very coarse texture and dull uniform hue.

In Malabar, there are still, on a small scale, examples of a very picturesque order of local architecture, which has been fashioned gradually, in past times, in obedience to the properties of the most accessible material and the requisitions of the sun and the monsoon. The solid portions of the structure are of laterite or brick, but the detached and salient parts, the columns, the deep eaves, the high-pitched gables, the shady and protected verandahs, the overhanging balconies, are constructed of the splendid woods of the country admirably wrought. The gateways of the Temple at Trichoor, the pagoda at Tellichery, the older portions of the Palace at Trivandrum, the remarkable ancient residences of the Princes of Travancore at Padmanavapoorum, offer attractive specimens of an indigenous art which is fast yielding to decay and the usurpations of European conventionalism. But in the construction of the public offices at Trivandrum there was a fortunate opportunity to build with local materials in the native style, and to unite both with the expansions and modifications necessary for the convenience of civilised administration. With brick or laterite for the inner portions of the fabric, with teak and jack wood for the porticoes and colonnades, the Public Offices of Trivandrum might in ingenious hands have been made to harmonise with the past and the present, to grace the landscape, to resist the weather, and to suit the habits and instinctive tastes of the native officials and population. The opportunity has been signally cast away. There was no want of liberality, no want of good intentions, but the despotism of foreign example was irresistible, and a costly edifice of the familiar plaster, classic type, which looks as if it had been designed in some European art academy in the second decade of the present century, affords an asylum to the cutcherry and durbar of the Maharajah of the Nairs and Moplahs. I may remark that meanwhile the beach at Aleppy was strewed with magnificent timber which the Government of Travancore neither sell nor use.

It is only just to add that the railway companies have in India, as in England, done much to accredit the use of solid, honest, and appropriate materials in construction; that the Art School of Madras is solicitous and active in the same direction; and that the Government is building an improved brick and terra-cotta kiln under the direction of the Department of Public Works, which will emancipate our public architecture for ever from the tyranny of chunam.

Let us now proceed to consider the question of style. Speaking broadly, there are four styles of architecture disputing the soil of India at the present time: the Hindu or Brahminical, the Mussulman, the European Classic, and the European Mediæval. These several styles claim our attention with reference to cost, to convenience, to beauty, and in regard alike to public and to private buildings.

There is no order of architecture belonging to an ancient and civilised people absolutely deficient in the elements of grandeur, and those who neither accept the principles nor admire the decorations of the Brahminical style may yet approach its capital monuments with interest and respect. Long before the traveller reaches the sacred precincts, whilst he is yet winding slowly over the weary plain, his eyes are fixed on the lofty pyramidal towers which preside over the Indian landscape with harmonious solemnity. As he draws near, the porticoes for the accommodation of pilgrims and for the purposes of traffic form a secular and popular adjunct to the temple, full of picturesque life. On one hand, the stairs descend to beneficent waters; on the other, the Pepul throws its religious and salutary shade. The entrance to the abode of the gods is fashioned with stupendous solidity. Within the walls the multitude of cloisters, galleries and pools, the profusion of ponderous material and delicate sculpture, and the dimness of the inner shrine, all combine to affect the imagination with those impressions which belong to vastness, mystery, and the lapse of incalculable time, to the patient, devoted application of human labour, and the ceaseless tribute of human worship. The Brahminical architecture is imposing; it is even poetical, with its accessories: yet, regarded both from a scientific and an æsthetic point of view, it is manifestly defective. In the Brahminical style, the ruling feature is the horizontal line: the wall or the column supports a beam, the beam supports a flat roof. When the building is lofty, the fabric ascends by successive horizontal stages, one succeeding another in diminishing proportions to the apex. The inherent poverty of this method of construction is often ingeniously concealed by decoration on the contours, and the fabric rises with a certain measure of continuity and elegance; yet the fundamental features can still be discerned. The characteristics of the style, as practised in the temples of Southern India, are a multitude of supports crowded together, small intervening spaces, square apertures, horizontal superposition, a vast expenditure of solid material and radical defects of form disguised by minute ornamentation. I know that in the northern varieties of Hindu building there are elevations externally of a curvilinear and sometimes of a domi-form outline; I know that the ancient Jain and Buddist builders were familiar with the construction of a dome on mechanical principles consistent with moderate proportions, and that some of their apertures have the configuration, if not the true constructive qualities, of the arch; but I seek not to explore the recesses of antiquity or to analyse all the diversities of style which at different epochs the different provinces of this vast peninsula may have disclosed. It is abundantly clear, from our everyday observation, that the arch and the dome are repugnant to the genius of the Hindu architecture, and have been for many ages practically unused by the Brahminical builders. But the introduction of the arch was the emancipation of architecture from the despotism of material. The arch and the dome are the most beautiful, the most scientific, and the most economical forms of construction; they are the proper methods by which large spaces can be covered; they are indispensable to the usages and recreations of modern public life. Considering the mechanical deficiencies of the Hindu style, and the predominance of sculptural ornamentation which it exhibits, it appears to me to be unavailable, under the present Government, for the purposes of the State, and ill adapted for the common and public use of the collective people. But is the Hindu style of building, for that reason, to be banished and degraded from all secular use, as is the case at present under the influence of unreflecting and ignorant innovation? Most certainly not. The methods of Hindu architecture may be practised in moderate dimensions with the greatest advantage, and they are perfectly adapted to the wants of the people. Domestic architecture should be the expression of social institutions and the necessities of climate. The principles of the old-fashioned Indian dwelling were seclusion and shade. For the women a tranquil, retired, and busy retreat; for the men privacy and repose after the labours of the day and protection from the scrutiny of grasping authority; for all, shelter from the sun. In its principal features it is the dwelling of the ancient Italians which we have exhumed, it is the dwelling that we admire at Damascus. To the street a plain exterior pierced by a few apertures, but often furnished with a hospitable porch, supported by stone or wooden columns of quaint design. A narrow door, deeply sculptured, leads into a court supported by a pillared verandah on which the private apartments open; behind this the offices and the habitations of the domestics. The interior court is the charm of the whole, it is the feature which the Indian house-builder should never forsake, and it is just the feature which he is giving up. It forms the most becoming frame for the life by which it is animated. It is in perfect harmony with the figures, the costume, the ornaments, the primitive industry, and the simple furniture of the inhabitants. The columns, the beams, the cornices, the panels of the ceilings, the doors, the pavements, all display the mouldings and patterns in which native art is so rich, and over which the patient native workman delights to linger. The ugly conventional image sculpture of the pagoda scarcely invades the Indian home, but some pleasant tree natural to the soil will add its rustle and its fragrance. There are such interiors still in Madura and Tinnevelly, of very modest pretensions, but which nevertheless reveal a true artistic character. Now, if this domestic architecture of other days discovers even in its humility a perfect appropriateness and a powerful attraction, what might not the same architecture become at the present time in the hands of a person of ample means, cultivated taste, and intelligent patriotism? If all the proportions were expanded, if all the materials were selected, if all the designs were chosen for the most exquisite and correct patterns,—and of such the whole country is a storehouse,—I do not hesitate to assert that nothing in the world could surpass it. Yet what do we see? The moment a native of this country becomes educated and rich he abandons the arts of his forefathers and imitates the arts of strangers whom, in this respect, he might be competent to teach. Nothing is more lamentable than the corruption and confusion of taste which is everywhere apparent, combined with unmistakable evidence of increasing opulence and an honourable desire for domestic comforts and decoration. The Hindu and European styles and ornament are all jumbled and piled together. In some thriving provinces a favourite improvement appears to be to build a Doric upper story, with plaster pillars of immense diameter, over the unpretending porch of the last age, with its slender Indian granite shafts. The same malady which infects the middle classes attacks the highest. I had the pleasure of visiting, not long since, in his country residence, a native nobleman, who, in addition to all the gifts of birth and fortune, possesses in his person and manners an unusual share of dignity and grace. I need not say that there is a numerous retinue and an overflowing bounty to Brahmins and native strangers. But the Jaghirdar recognises the duty of hospitality in every form, and he has built himself a little palace in a pleasant garden, where he delights to honour his European guests. It may seem ungrateful to me to criticise a dwelling in which I was treated with so much respect and kindness, but I could not repress a sentiment of regret when I found that every trace of native style had disappeared from the most recent example of native building, and that a handsome European villa, of spotless chunam, had risen among the grey pagodas and choultries and the whispering palm-trees.

It is possible that I may be speaking in the presence of some native gentleman who has made a fortune by the exportation of cotton, and who is about to build a new house. The case is not common in Madras, but it is not incredible. If there be such a one here, I beseech him to pause before he sanctions the modern "Muster" which I mentally see before me. I say to him, Discharge your Madras architect, and take a maistry from some remote part of the Mofussil where the traditions of the fathers are still preserved. Determine to have a national house, but such a house as an Indian gentleman should inhabit under an honest Government, in an age of peace, justice, and learning, a house in which the light of heaven and reason and freedom can penetrate. Adhere in general to the ancient plan, and especially to the court and colonnade; collect all the best models and patterns of native mouldings and sculpture; use brick of the finest quality, from the School of Arts, for the exposed surfaces; employ timber for the pillars within, Cuddapah stone for the pillars without, glazed tiles for the floors; make a liberal use of ornamental stucco and painting where the rain cannot penetrate;

fill the unglazed apertures with the beautiful tracery of which Indian art offers an unrivalled variety. For glazed windows, authentic models may be wanting; but they can be treated in the spirit of the style; and the Government architect can show you how. Get all your carpets from Vellore, and your stuffs from Madura and Tanjore. Where the Hindu patterns fail you, borrow from the Mussulmans. Make a sparing use of European furniture, and endeavour to harmonise it with the native forms. But in doing this, make everything lofty, light, bright, spacious and accessible. The task would not be easy, but it can be done; and every effort would be better than that which preceded it. Endeavour to realise this, that the Indian arts which you are at this moment casting away here are at this moment in London and Paris an object of inquiry and study to the most learned and cultivated minds. Do not imagine that you are required to do anything unprecedented. All I ask you is to do what has been done in Europe itself. In Europe the ancient national arts were for a couple of centuries as much forgotten and despised by us as the ancient national arts of India are now forgotten and despised by you. You have hitherto imitated our errors. I call upon you to imitate us in correcting them. I may add that an admirable opportunity now presents itself for an intelligent revival of the domestic architecture of the Hindus in the construction of a small palace at Bangalore for the residence of the young sovereign of Mysore. The building will be placed, I believe, in juxtaposition with the dilapidated but beautiful Durbar Hall, constructed in a mixed Indo-Saracenic style by Hyder Ali. There is no want of time, there is no want of money, and the authorities mainly concerned are an accomplished civilian and an accomplished soldier, Mr. Bowring and Colonel Malleson, both trained in the North of India, where secular and palatial architecture attained under native government the most exquisite perfection. I expect the result with curiosity.

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I now come to consider the forms of architecture introduced by the English in this country, which reflect the condition of art in England itself.

In an artistic point of view, the contemporary use of conflicting styles of building, or the abrupt addition and juxtaposition of modern styles of one type with older styles of another, is undesirable. The most conspicuous proofs of this may be seen in English cities at the present time, when one style is generally used for domestic and another for public and sacred structures, and where occasionally private houses of an unusual character are thrust into long rows of habitations of the familiar sort. We have private houses, which, for convenience, I may designate as Classical and Gothic churches, and here and there we see a Mediæval house interposed among its Classical neighbours. The horizontal and ascending lines are thus mixed up in our streets and squares, in a fashion which offends and perplexes the eye; decorations and details are not diversified, but discordant; buildings acquire the appearance of specimens or imitations selected capriciously from the examples of the past; art ceases to be the expression of any necessity or taste common to the age; and its harmonious development, in conformity with new social requisitions, is materially retarded. This state of affairs is the more deplorable, because it is unquestionable that our ancient national style of building, as it existed before the substitution of the Classical for the Gothic forms, was equally available for secular and religious purposes, that it was susceptible of developments suited to modern life, and that it comprehended varieties of outline and ornament which would have defended it against the reproach of a tedious uniformity. The northern nations of Europe do not require more than one style of architecture, comprising, of course, the local and subordinate diversities, which the use of stone, brick, or wood, opulence or poverty, exposure or protection, and similar secondary influences would naturally produce. Those nations have all virtually the same religion, the same institutions, the same climate, the same habits of life. It is more easy, however, to lament the existing confusion than to correct it. No one can predict to what issue we are drifting; no one can tell whether the prevailing chaos of taste will settle down into some new order, or whether the architectural anarchy is to last for ever.

The harmony of architecture which might have been preserved in England, and indeed throughout all the nations of Germanic origin, could not be expected in India, where for centuries two peoples, sharply opposed in religion and distinct in many other respects, have occupied the soil, and where a third race and a third religion have recently been planted in artistic antagonism with the others. Under these circumstances, contrasts were unavoidable, and my countrymen have certainly done nothing to mitigate them. The English have simply transported to India the fashions and revolutions in architectural taste which have occurred at home, but following them leisurely and being always behindhand. We, too, live and work in one sort of building and worship in another. The ruling opinion at present appears to be, that the Classical style is good for habitation, and the Gothic indispensable for prayer. I venture to dispute the first position, and I most earnestly deprecate the second.

It would be unjust and ungrateful to depreciate, in all respects, the buildings which we inhabit, and which for the most part we owe to the liberality of a former generation. Many of the houses of Madras are constructed with due regard to the nature of the climate, and in proportions which far excel anything with which we are familiar in England. Some even indicate a higher cultivation and feeling in art, among the official architects, in an earlier period than is usually found among those of the present time. It must be admitted, however, that there is a mournful uniformity of design externally, a total absence of colour, and a disgraceful poverty of material; while the authoritative practice of this kind of building is not only at variance with all that India itself formerly produced, but, by the force of example, tends to pervert the taste of the natives of this country. If the Classic houses are bad, the Gothic churches are worse. The Gothic style of architecture, which was developed in a temperate climate, cannot be rendered appropriate to a tropical one, without modifications of structure, which only an accomplished and inventive artist could design. Of all the styles which possess a perfect mechanical development it is the most expensive. It demands the finest materials and the most delicate treatment; painting and sculpture in their highest forms are alike indispensable to its perfection; and though it may not absolutely exclude the use of brick, it is decidedly uncongenial to that material, the extensive use of which is so indispensable here. The ordinary style of a Gothic church in India may be seen in Blacktown or in Vepery,—meagre, cheap, plaster counterfeits of the glorious originals to which we affectionately turn in memory and in hope. I know that there are happier attempts. At Megnanapoorum, in the sand wastes of Southern Tinnevelly, the energy of an enterprising missionary has raised a fabric in the Early English style, which would grace the plains of Suffolk or Lincoln, and in which I have heard 2,000 Tamil voices mingled in Christian psalmody. At Edeyengoody, the most learned pastor of the Shanars, but who counts his learning for nothing compared with the service of the Lord, trains the Indian mason in the arts of the northern craftsmen, and watches over the growth of a Decorated structure, which will be the creation of his life and the monument of his ministry. Even the Roman Catholics at Dindigul and elsewhere are following the same track. I admire the piety of the founders, but I question the wisdom of their selection. I question the propriety of adopting the Gothic as the architectural type of Indian Christianity. It cannot be necessary, for Christianity flourished for a thousand years before the Gothic was invented, and for three hundred while the Gothic was in abeyance. It can scarcely be desirable, for the Gothic is remote from the forms of Oriental art and from the traditions of the Oriental Church. It may be objected that the notion of bringing Christian architecture into harmony with the native architecture of India is impossible, and that if it were possible it would be of no importance. I grant that it is not of any serious or vital importance. It is a mere matter of fancy, of taste, not one of policy or morals. But I do not admit that it is impossible, and I affirm that if it is not done, the blame, if such there be, must rest with the artists and not with art.

I have already submitted that the Mussulman style of architecture offers, for secular public buildings, all the conditions of beauty and utility that can be desired. As a matter of personal taste, I see no objection to the adoption of the same style for the private habitations of Europeans. There is nothing in that style incompatible with our habits and beliefs. It allows no images, it uses no symbolical ornaments, it possesses nothing that essentially fixes it to any particular nationality or particular faith. The florid calligraphic inscriptions in the Persian and the Arabic characters, which occupy in this order of art the place of pictorial representations, can be dispensed with, or supplanted by the superficial linear combinations which are equally sanctioned. The rest is mere form and colour. Mussulman art is essentially spiritual and universal. Englishmen might, however, in general, demur to live in habitations constructed in a style which is historically and conventionally, if not by any positive principle, associated with races of a different religion and different manners from their own; and it is certain that Christians cannot assemble for worship in a mosque. Where, then, is the method of reconciliation between native and Christian art? To what point of approximation can the European advance? The history of art supplies an expedient. It contains a style of building which is at once Oriental and Christian.

While the architecture of ancient Rome assumed, in the hands of the Mussulman builders, that beautiful transformation which we designate Saracenic, the Christians of the East worked out the same original forms in another, but a cognate, manner, which prevailed for a time over Northern Italy and Asia Minor, which assumed in Georgia a type peculiarly ornate and picturesque, and which became the basis of the national architecture of the Russians. It has been revived in various parts of Europe in our own day, under the general title of Byzantine. The Byzantine style, like the Saracenic, embodies, as its distinctive features, the arch and the dome, while the slender separate campanile in the first answers to the minaret in the second. The arch has rarely, if ever assumed, as far as I remember, in the hands of the Oriental Christians, when used constructively, the pointed or the horse-shoe shape; but when used decoratively, it offers, in its superficial combinations and intersections, many resemblances to the Saracenic forms, resemblances which are still more apparent in the minor details of mural ornamentation. The two styles have ever retained a certain family likeness, and the common possession of the dome constitutes a capital point of union. While the Byzantine style of building is perfectly adapted for every domestic purpose, I need scarcely say that in the hierarchy of Christian styles it occupies the most venerable place. It was the first Christian style, nor has Christianity formed a finer since. To the Anglican it presents the image of those primitive centuries in which our Church loves to trace the patterns of her faith and ritual; to the Roman Catholic the architecture of St. Mark's can never be repugnant; to the Protestant bodies generally it furnishes forms more simple than the Gothic, more suited to great congregations and to oral teaching. The question is a speculative one, and many might deprecate, in our present position, another innovation. But to me the Byzantine style seems to offer the best architectural type for Christianity in India, a type sufficiently distinct, yet most in harmony with one capital section of the ancient monuments of the country.

TECHNICAL EDUCATION OF THE ARTIZAN.

A visit to the Workmen's Exhibition, in Islington, and a glance at some articles of constructive carpentry and joinery in the Netherlands Section, bring forcibly again to our minds a subject which has often been advocated in this paper. To the building trades particularly our remarks refer. Until all our workshops become, in theory and practice, normal schools of art, the proper education of the artizan will not be effected. Skilled workmen, workmen who can plan out their work, as well as execute it with an artistic finish, are greatly in the minority, in all our workshops. Experience can produce an ordinary good workman, but no length of experience or following will compensate for the want of technical knowledge. To the carpenter, joiner, mason, stone-cutter and carver, and the plasterer, technical education is all-important. Parents who intend their sons to follow any of these trades ought, as a requisite, to see that their youths at school learn arithmetic and geometry. No tradesmen are more often

called upon to work out in practice the theories they have learnt in school than building mechanics. Euclid should be their text-book in youth; for a knowledge of its elements will, in after years, save them considerable pains and loss of time, and in many instances loss of employment. We consider that a journeyman carpenter, joiner, or mason, who requires his work "laid out," or "struck out," for him, is little more than a machine. It may be, and is, necessary, in large workshops, that the foreman should give directions, and furnish a working drawing, pencilled out on a piece of board. But though this may be necessary on the part of the foreman, so that the proper organization of labour in the workshop may proceed regularly, the workman should, if necessity required it, be capable of doing all that his foreman can do. The workman should thoroughly know the principles of his trade, as well as its practice; for occasions may and will arise when he will be called upon to trust to his own mental resources, away from his companions by the bench. The making of a sash, the framing of a door, the preparation of boxings and shutters for windows, and their fixing, comprise but a small amount of a joiner's work; in fact, this is merely what any apprentice of short standing can do. Give any workman a template or mould, and he must be very stupid indeed if he cannot properly prepare its counterpart. We wish to see our building artizans educated to the standard, that when the plan and detailed drawings of a house are put into their hands, they will feel no difficulty in undertaking them. Every mason and carpenter deserving of the name, if required, should know how to work to or from scale, and should find no difficulty in making working drawings from the architect's plans and instructions. The construction of a staircase has always been considered a pet job, among carpenters and joiners; and until late years there were but comparatively few hands in our builders' workshops who thoroughly understood the branch. Many even now of our professed staircase-hands hardly deserve the name. It is pitiable at times to witness, in some of our mansions or public warehouses, the things called staircases. Of course, we do not intend, when talking of staircases, to bring into the category those break-neck step ladders to be seen in modern houses of the "Jerry" class. We have often witnessed some first-rate houses completely spoiled, in an artistic point of view, by an abominably ugly staircase, the hand-railing often, if not invariably, being the most disgraceful part of the affair. We have known, in our experience, tons weight of valuable mahogany to be simply butchered by the most egregious blockheads and butchers of wood that ever handled a plane or gouge;—butchered, we repeat, from causes which are not creditable to mention. Perhaps it arose from the miserable saving of a few shillings, in the first instance, on the employer's side, who preferred it cheaply done; or, on the other hand, shall we say, the workman undertook to do a piece of work he knew next to nothing about. What is proved by this? want of technical education, both on the side of the employer and the employed; for if the employer had his eye educated he would be ashamed, for his own credit's sake, to allow bad workmanship to pass; and, if the workman understood the principles of his trade, he could not be a "botch."

It is indispensable that every building artisan should have a knowledge of "lines." The carpenter, mason, bricklayer, or stone-cutter who is ignorant of them is certain to be an inferior hand. If the workman can draw or properly "lay down" on a piece of planed board the work he is about to execute, he will feel no difficulty in his way, and will lose no time. If he cannot do so, and has no one near who can do it for him, he is certain to lose his time by a system of "groping," working by "rule of thumb," and undoing again and again what he has spent several hours over, doing wrongly.

No workman can put up an intricate roof or staircase who does not understand the setting out of the templates or moulds for its working, or for the "cuts;" and how many times have we not been a witness to the wasteful cutting up of perches of scantling to arrive at the proper "cut" for a rafter or purlin against the hip rafter. With a little technical acquaintance with "lines," the workman could set the proper bevel, and apply it to the end of his piece of scantling, and the work would be accomplished at first cutting. A knowledge of the development of curvilinear surfaces is requisite for both mason and joiner, and we think no better novitiate could be for the young carpenter-apprentice than to keep him, for the first year, in the workshop, in learning the principles of construction by the aid of drawing, and then making him, according as he understood the theory, work out the practice in the framing or putting together of articles entailing but a small waste of material. His time would be more profitably spent in this way than in spending his first twelvemonth in boiling the glue pots, heating the workmen's breakfast cans, and running on endless errands for the workmen. Under the eye and guardianship of intelligent foremen, the young apprentice could be moulded into the making of a good and skilled workman; and, in the absence of a special school of art for the technical education of the artisan, much and lasting good might be thus effected.

Of late years the exigences of life have destroyed many observances and requisites, and have forced into activity an unhealthy state of society. These changes are more observable among our working classes than in other quarters. The mechanic's son now, whether he be mason, joiner, plasterer, or painter's lad, has scarcely left off his long clothes when the father calculates on having him on the building with him as a help. Thus, hundreds of little boys, under their twelfth year, are learning the trade of their fathers—earning a few shillings a week, with hardly any education, and fated, in after life, to be, of necessity, indifferent and ignorant workmen.

Ordinary schools are plentiful enough now, and no boy should be put to learn his future trade without a tolerable primary education. But what is a tolerable education for the young artisan? Sufficient acquaintance with arithmetic and geometry as to give the youth the facility of ready calculation and measurement, and enough plain English to make him spell, read, and write correctly. This much, at least, is expected by society at the hands of the humblest artisan on behalf of his child. This can be had free, or at a nominal cost. The parent that would refuse to afford his children this much should be compelled to do it. State or municipal power should step in when the parent fails to see it done, and then if it is found the parent is able to pay, it should have power to recover the expenditure. Compulsory education, by all means, where the parents are able, but unwilling, to school their children.

We began our remarks in the Netherlands Section, in the Workmen's Exhibition, and we find ourselves nearly back in the nursery. There are a few things shown in constructive carpentry and joinery, on the part of the Netherlands, and illustrated by drawings, which are useful for the young apprentice to study and imitate. The simplicity of construction is made apparent on looking upon these things on view, but in their absence the youth would find it a little more difficult to understand from a mere drawing the technical lesson he can learn by their examination. The young carpenter can here see how cylindrical surfaces develop themselves, how joints and mitres are affected and change when they break on curved bodies or angles. Ribbed vaultings, curved panellings, elliptical hyperbolia and parabolic development may also be seen and traced, in inception and execution, and a good lesson in technical education may be learnt by the young aspirant if he wills it.

Good and excellent work is done in London in carpentry and joinery by English mechanics; none better need be wished for; but we cannot conceal the fact that execrable workmanship is also performed, and a large amount of it. Much of the work performed in houses that are built to "sell," hardly deserves the name of carpentry or joinery.

The establishment of schools of art, on a more enlarged scale than hitherto,—workshops not confined alone to artists in marble and colour, but workshops and studios, where the building craftsmen may learn, not only the theory of their different trades, but the principles on which they are based,—this is what is wanted. The same necessity exists to show the carpenter, mason, and joiner models of the different articles he may be afterwards called upon to construct, as exists for teaching the sculptor and painter. If the latter are allowed to study from good models, they become better artists; and if the youth of the building trades, during their early apprenticeship, can be ushered into museums or studios, where they can see models of roofs, staircases, domes, columns, and their entablatures, worked to scale, their understandings will be enlarged, and their power of imitation will be more rapidly and easily developed, consequently they will become more enlightened and skilful workmen. But they themselves must work: merely looking about is of no use.

Whatever tends to give the workman a more intimate knowledge of his business, tends to make him a more independent and valuable member of society. Thus we see in the present Workmen's Exhibition a valuable auxiliary in imparting practical instruction, and forwarding the technical education of our artisans.

WASTE OF PUBLIC MONEY.

Some one in authority ought yet to be hung for robbing the nation in the course of the Abyssinian expedition. The story told by the Commons' Committee, and more especially by the chairman of that Committee, in a rejected report, is a foul and degrading one. It causes us as much shame as anger. The wonder is, considering the amount of fraud and incompetence which prevailed, that a successful result was obtained. We should care nothing about the amount spent, if it had been needed to effect what was desired. Our indignation is caused by the fact that half the amount was wasted by stupidity, or abstracted by cupidity. Mules were bought at recklessly high prices, and sacrificed for want of care; some 29,000, at a cost of at least 40*l.* a piece, being either destroyed or abandoned. A contract for camels was made after the fall of Magdala was known to the purchasing officers. Enormous quantities of forage were sent over sea that not merely were not used, but, under the circumstances, never could have been. Thousands and thousands of pounds were paid to get rid of contracts that had been made unnecessarily. Three hospital ships were despatched from England, though the Bombay Government only asked for one; their hire exceeded 136,000*l.* The chairman of the Committee says it would not appear to be a violent inference that at least one million of money was expended on tonnage more than the necessities of the expedition justified. For a few months' hire vessels obtained payment to the extent, in some cases, of four times their market value. The *Continental*, an old sailing ship of 1,464 tons, without any character, and whose value was therefore not more than 4*l.* per ton, or say 6,000*l.*, was chartered at 1*l.* 14*s.* per ton per month, and received for 9½ months' hire 24,000*l.*, or four times her value. It may also be mentioned that the three hospital ships, which cost for freight 135,123*l.*, were sold on their return for 50,000*l.* Thousands were paid for vessels that were chartered and never used, and hundreds of thousands to vessels left lying at anchor doing nothing, while other ships were being engaged.

The account of the manner in which the railway was bungled, as condensed by the *Times*, is almost past belief. Surely the matter will not be allowed to rest here. What would become of the nation under this system if we were dragged into war with any great power? As a matter of course, no risk should be run in providing for a campaign, precautions of every kind should be taken, the supplies should be on the most ample scale; but to allow again such an amount of jobbery and robbery as the reports make evident with reference to the Abyssinian campaign, would be a disgrace to the Government under which it was permitted.

A NEW FORT OFF PLYMOUTH.

The fortifications which enclose the Three Towns are nearly finished. Seaward, a fort which is in course of construction upon an artificial island of stone immediately within, but detached from, the centre of the Breakwater has been delayed. A plan, however, has been definitively settled, and the works are proceeding.

The Breakwater Fort, according to the *Western Morning News*, will be the strongest and most important structure of the kind in existence. It will be the key to the defences in the Sound. Lying low itself, it will command the whole of the waters on all sides, and will co-operate, as regards the entrances to the roadstead, with the battery at Picklecombe on the one hand, and that at Bovisand on the other. "The whole of the outer face of the masonry of the substructure is of finely-wrought granite blocks. In its upper portion, which is of brick, are placed the magazines, shot and shell stores, &c., above the water level, but protected from an enemy's fire

by upwards of 18 ft. of solid masonry. To a casual visitor these magazines and stores, which are approached by two staircases, one at each end of the fort, present a bewildering maze of chambers and passages. In reality, however, their plan is as simple as it is effective. There is first a central group of chambers; then a passage running round them; then a ring of chambers; and, finally, another passage exterior to them. The gun-floor will contain eighteen guns of heavy calibre, will be protected by 3 ft. of armour, and will be covered by a shell-proof concrete roof, 4 ft. in thickness, resting upon iron girders. The armouring is now being fixed in its place. It consists, first, of a series of vertical iron bars filled in with teak; then a layer of horizontal bars; then 2 in. of iron concrete—iron filings and asphalte; then of another layer of vertical bars; and, lastly, of the outer plates, which are of extremely massive character. At each end, immediately above the two staircases, there will be a couple of turrets, armed with the heaviest guns in existence—600-pounders, or even larger should they be invented.

All this sounds very well. Let us hope the work is being done well. Some of the forts forming part of the fortifications here, which we examined a year or two ago, were faulty in both design and execution, and would be worse than useless under certain circumstances. One or two of them, indeed, if we remember rightly, shortly afterwards collapsed. We trust a better system of things is now in operation. Who are the responsible supervisors?

THE WOUNDED IN WAR.

The admonitions of the *Builder* as to "open-air treatment" of wounded and sick at the seat of war, widely repeated both at home and abroad, have not been without their uses, as this paragraph will show:—

"Seven hundred soldiers, wounded in the combat of Borny, arrived on Sunday night at the Eastern Station, in Paris. Instead of occupying closed compartments, the men were distributed on beds of straw made up in the goods wagons, exposed to the open air. This mode of transport is recommended by the medical men in favourable weather."

The Germans are also said to be treating their wounded and sick men in temporary shed hospitals.

Some of the war correspondents complain of the surface-filth in the French camps, as also of neglect in the French in not removing their wounded from the field. Cleanliness and humanity in war are not more necessary than they are profitable. That army which has its sanitary and hospital arrangements best ordered and carried out will fight best and endure longest. Neglect of the wounded is a remnant of the worst sample of barbarism. War, under any aspect is horrible; care for the wounded alone redeems it from mere savage brutality.

BENEFIT BUILDING SOCIETIES.

A "slaughter of the innocents" occurs towards the close of every session of Parliament, and the session recently concluded has not been an exception to the rule as regards the performance of this unsatisfactory act in the legislative drama. Many of the victims will have, doubtless, their respective circles of mourners. There was one unfortunate that departed, it may be believed, "universally regretted" by all who were acquainted with the promising little hopeful; we refer to the Benefit Building Societies Bill, which was introduced early in the session under the sponsorship of Mr. Alderman Gourlay, one of the members for Sunderland, Sir Roundell Palmer, Mr. Stevenson, member for South Shields, and Mr. M'Cullagh Torrens, one of the members for Finsbury. It was just such a measure as such a Government as that now in office might have been expected to regard with favour, and the conversion of which into an Act they would have been ready to facilitate. Party questions may now be said to be disposed of, and Government has occupied itself worthily in somewhat of the character of an Imperial Social Science and Law Reform Association, armed with plenary powers. The Bill had not an iota of the party element in it; the defects alleged, rightly or wrongly, to attach to friendly societies, or some of them, and the difficulties that encompass the question of trade unions, and the legal protection of their funds, were entirely absent in this case. The passing of the Bill would have conferred a great boon upon many thousands of the provident, well-doing classes of the community, who have the strongest possible claim to legislative facilities, when these can be given without cost to other portions of the community, for the safe and efficient administration of their affairs; and to enable them to carry into effect, without legal encumbrances and hindrances, their highly laudable objects. The Bill was drawn at the instance of representatives of a large number of building societies in all parts of the country, and its real was strictly in accord with its professed purpose, "to consolidate and amend the laws relating to Benefit Building Societies." The promoters of the Bill deferred, not from luke-warmness or indifference, from pressing it forward to the inconvenience of the Government. When the time came for them to demand attention, the reward they received for their accommodating spirit was to be told that they were too late. There was only one petition, signed by one person, against the Bill, but on the motion of Sir M. H. Beach, it was shelved after it had passed through the committee in the Commons, and been amended.

The Bill provided for registration of rules, and of all alterations in them; the enrolment of societies; the publication of accounts; security to be given by officers; security for, and recovery of debts and property; directed how actions by or against trustees should be conducted; that disputes should be determined by arbitration; how the Court might order compliance with the decision of arbitrators, the order of the Court to be final; with numerous other useful and reasonable provisions, for the safe, speedy, simple, just, and efficacious transaction of business. Mr. Gourlay has given notice of motion to re-introduce this Bill in next session, when it is to be hoped the promoters will not be so diffident in pressing it forward to a consummation.

Mr. Dodds has given notice of motion for next session for a select committee to inquire into the Benefit Building Societies' Acts, and to consider any, and what, amendments are required therein.

BRISTOL; ITS SEWERS, SANITARY REGULATIONS, AND ITS DEATH-RATE.

Some twelve months since Dr. Budd wrote up the excellence of the sanitary arrangements carried out in Bristol, and the *Times*, by publishing the articles, gave notoriety to them. Bristol was said to be the best regulated town in Great Britain. Disease was detected at its commencement, and was then stamped out. Since this statement the Registrar-General's Returns have almost invariably shown Bristol to be one of the most unhealthy towns in the kingdom. Bristol stands on steep gradients, the main sewers have rapid fall, and discharge the sewage into the river, and houses are connected directly with the sewers. At low water the sewer-mouths are open, so that any wind there may be can drive in. *And the main sewers are without adequate ventilation.* All this summer the river through the city has been foul with sewage, and the state of sewers and drains is so bad, that the *Bristol Times*, as quoted in the *Builder* (20th inst.), designates the beautiful city "a whited sepulchre." Will the local surveyor see to the closing the mouths of all open sewers, and provide abundant and free ventilation, especially at the upper ends of all sewers? remembering that otherwise sewers and drains are flues for foul gases to enter the houses. Intercept the sewage, take it to land, and let it be used in irrigation, and Bristol will then be both improved and benefitted.

TORQUAY NEW HARBOUR.

Sir Lawrence Palk, M.P., has been supplementing good work done at Torquay by his father, by constructing an outer harbour; and this is now so near completion that an entertainment was given to Sir Lawrence last week, in recognition of his liberality and public spirit. The provisional order for the construction of the harbour was obtained about three years ago. Plans were prepared by Mr. Margary, engineer; the contract was taken by Mr. Mountstephen; and the works have now been nearly completed, at a cost of 30,000*l*. The old basin, still in use, is six acres in extent; the new one is ten acres. It is enclosed by a pier of massive masonry, which runs out 650 ft. from under what was once the Beacon Hill, and has a cant at the outer end. The pier is built of limestone and concrete, some of the blocks of the latter exceeding 20 tons in weight; and is sheltered seaward by a stout parapet. There is a minimum depth of water in the harbour of 18 ft., at the lowest spring tide. Adjoining the quay is an extensive range of stores, designed by Mr. Rowell, architect, and so constructed as not in any way to block the view from the road behind; whilst the roof of the upper range is made to form a promenade. This is in partial substitution for the open public space which formerly existed on the Beacon Hill, and which has been removed to make room for large assembly rooms, erected by Sir Lawrence, in connection with the baths, also from the designs of Mr. Rowell. The principal room will be a handsome apartment, when finished.

THE CHELTENHAM SEWAGE FARM.

In our last we briefly mentioned the approach to completion of these works by the town of Cheltenham. Indeed, as far as the extension of all the outfall sewers, they are now finished, so that all the fluid, after the solid sewage has been arrested in the tanks, is carried on and applied to land which the commissioners have purchased, and to other suitable land in the vicinity, thereby removing a great nuisance which has long existed in regard to the pollution of the two streams which form the natural outfall for the drainage, as the water now flows into them after passing over and through the land in a comparatively pure and very satisfactory state.

There is still a good deal to be done in regard to the land, but the effect has hitherto been extremely good, and those concerned feel reason to believe that the ultimate result will be most successful.

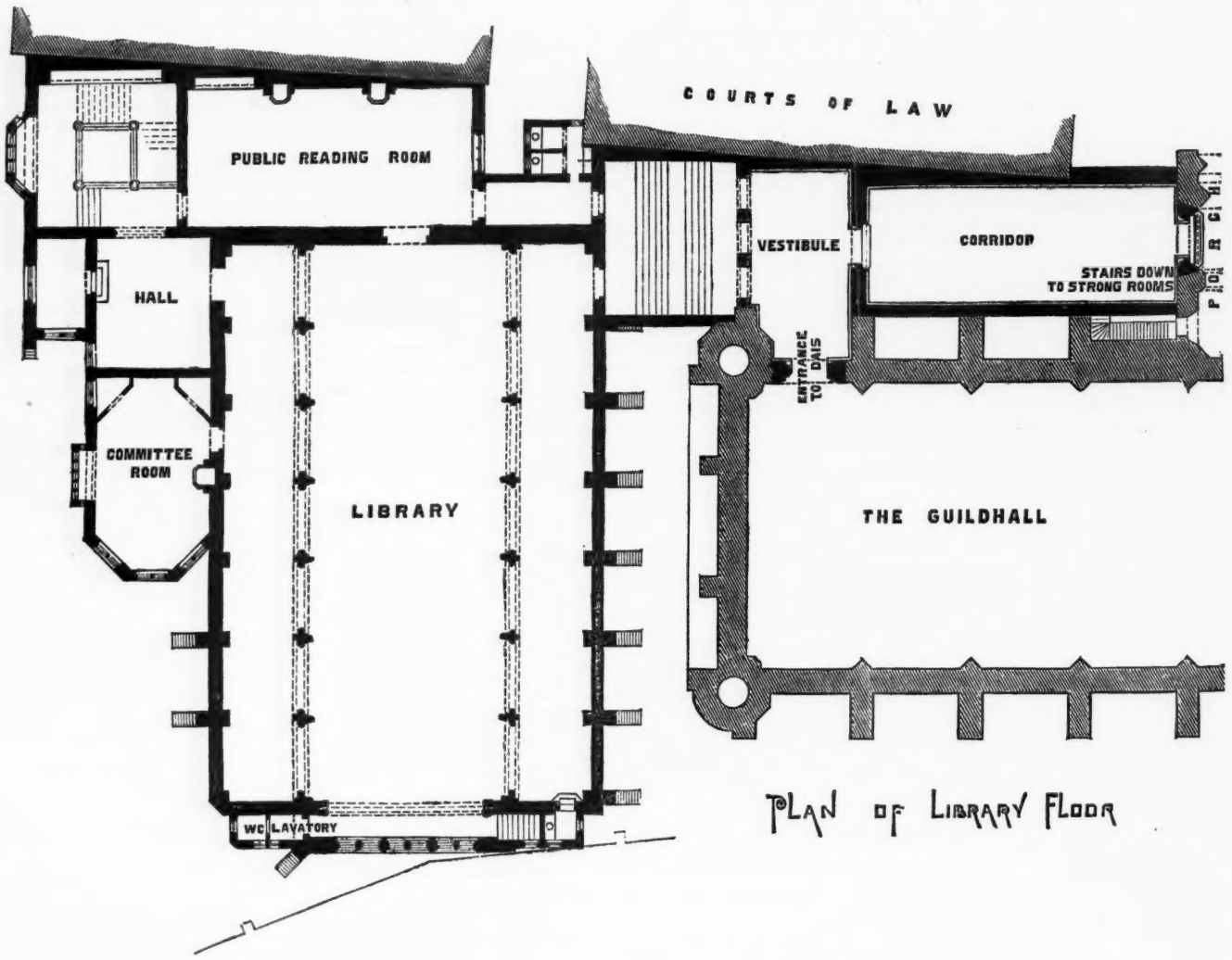
The whole of the works were arranged by the borough surveyor, Mr. Humphris, and Mr. W. Smith has acted as clerk of the works from the commencement.

We shall look anxiously for the results of the system adopted.

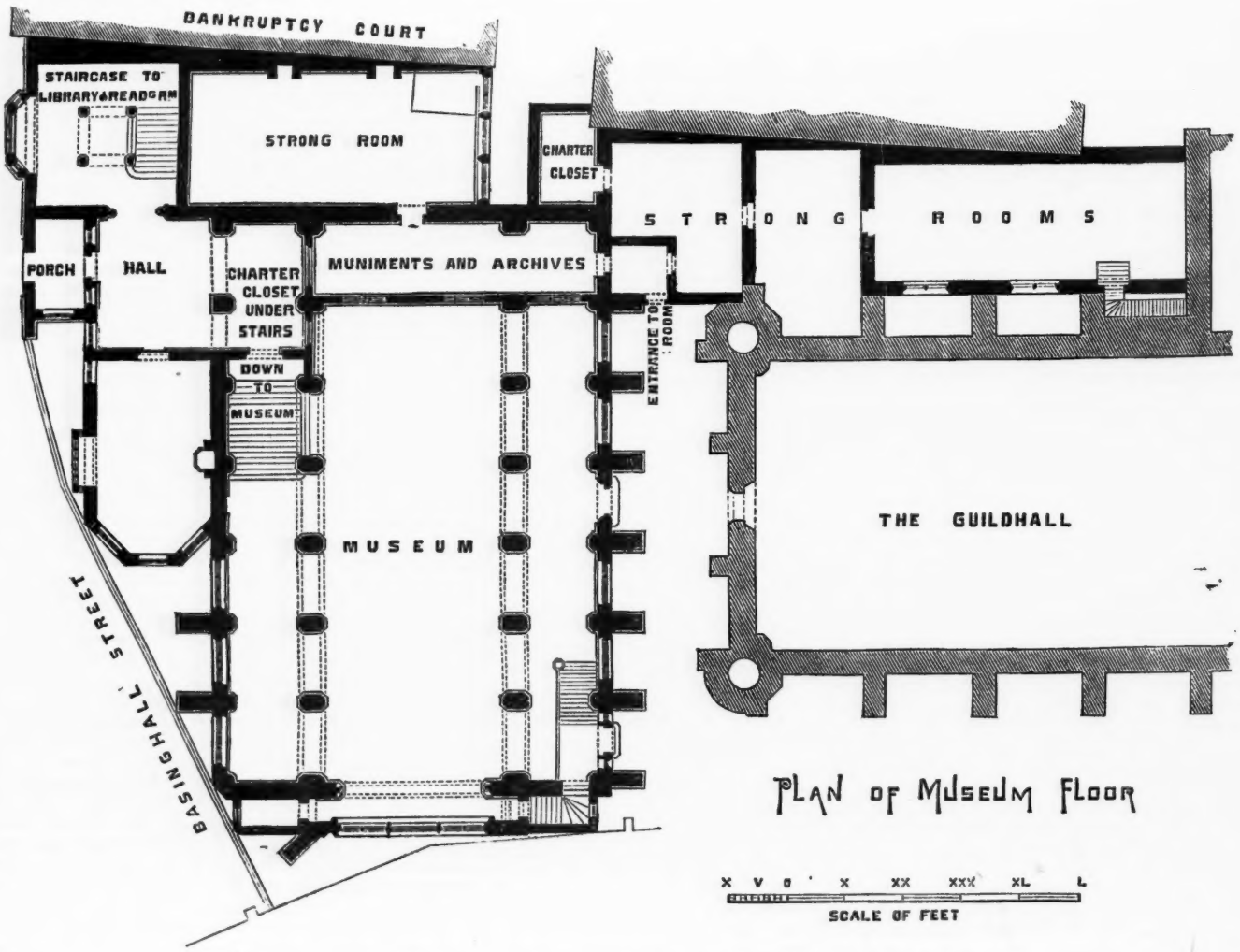
LIBRARY AND MUSEUM OF THE CORPORATION OF LONDON.

The foundations of the new Museum and Library adjoining Guildhall, and with the entrance front in Basinghall-street, next the Bankruptcy Court, are completed to the damp-proof course throughout, and the work above is commenced. The Corporation has long been urged to provide a proper and accessible building for their very valuable library and museum, but it was not till quite recently that circumstances served for the fulfilment of this wish. An appropriate and convenient site adjoining the Guildhall being obtained, the city architect, Mr. Horace Jones, was instructed to prepare a design, and a contract to complete the building in accordance with it, for 21,360*l*., was entered into by the Messrs. Trollope. The public are much indebted for this result to the energy and persistence with which the chairman of the Library and Museum Committee, Dr. W. Sedgwick Saunders, has followed up the subject.

We give a view of the building as it will appear in Basinghall-street, together with plans of the two floors. The style is Gothic, to accord with the Guildhall, and the external facing stone. The museum, on the lower floor, ranging with the Guildhall crypt, will be 83 ft. 2 in. long and 64 ft. 4 in. wide; the library above it will be 98 ft. long, and about the same width as the museum: the height will be 45 ft., the roof of oak. Adjoining the library are a public reading-room, 50 ft. long, and a commodious committee-room. A flight of stairs leads from the library to a vestibule opening on the dais in Guildhall, and which is approached also by a corridor 54 ft. 6 in. by 20 ft. 6 in., opening into the existing porch of the hall in Guildhall-yard. These arrangements, it is evident, will materially increase the accommodation and facilities for great entertainments or receptions. We should have mentioned that below the corridor, and extending to the library staircase in Basinghall-street, is a range of strong rooms and apartments for muniments and archives. There is every reason to expect that the new library and museum will reflect great credit on the Corporation and all concerned in the erection of them.

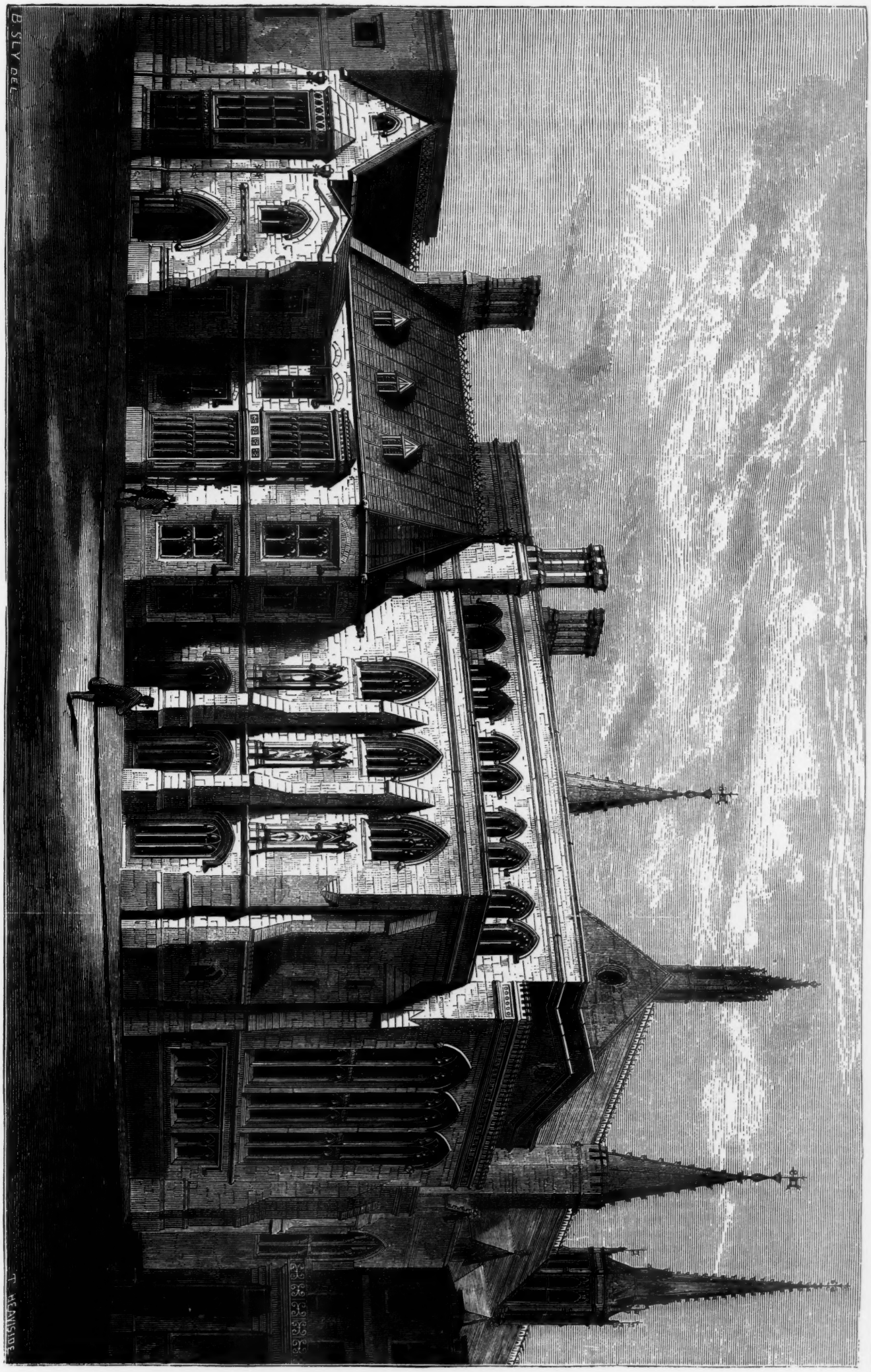


PLAN OF LIBRARY FLOOR



PLAN OF MUSEUM FLOOR

THE CITY LIBRARY AND MUSEUM, GUILDHALL, LONDON.



THE CITY LIBRARY AND MUSEUM, GUILDHALL, LONDON.—Mr. Horace Jones, Architect.

THE CHURCH OF ST. OUEN, JERSEY, AND ITS RESTORATION.

I venture to think that a few notes on the restoration of the Church of St. Ouen, Jersey, and of its re-consecration by the Bishop of Winchester, on Friday, the 5th of August, may prove interesting to some of your readers, as an evidence of the rapid growth of church feeling in the island within the last few years.

The church of St. Ouen is an interesting example of a type of church peculiar, I believe, to the Channel Islands, and consists of a nave and chancel, both having aisles, with central tower, and low square spire, forming together, before the prolongation of the chancel eastwards, in the restoration, a parallelogram of about 96 ft. by 53 ft., roughly speaking. The date of its original consecration is 1133, and it probably then consisted only of nave, chancel, and transepts, the aisles being added at a subsequent period.

The church is vaulted in a manner peculiar, I believe, to these churches. The vaults are perfectly plain, in the form of an acutely pointed arch of rubble masonry, springing from the walls, without the intervention of a cornice, and strengthened internally by flat bands of masonry. The vaults are generally of the roughest and rudest description, and invariably plastered. Externally, the masonry is formed to a regular slope, and the tiling laid directly upon it, without any timber work whatever. The lateral thrust of such a vault would naturally be great; accordingly the walls are built of great thickness, and are very heavily buttressed. When the aisles came to be added subsequently, the columns and arches necessarily had to be built of a corresponding thickness to sustain the weight of the wall above: the result is, that the columns and arches, at first sight, on account of their being so thick and squat, have all the appearance of being Norman or Transitional work, did not an examination of their mouldings prove them to be the work of the Flamboyant period. All the masonry of these churches is of granite, with little exception.

This church of St. Ouen is remarkable, internally, for a very curious staircase of masonry, leading to the central tower, to which it is the only access. I believe there is only one similar example known.

The windows consist principally of single lancet openings, nearly 3 ft. in width, but there were remains, on the south side of the church, of two-light windows, with Flamboyant tracery, long since destroyed.

About five years ago the building had fallen into a very miserable plight, both externally and internally. The tracery of the windows, as first mentioned, had been cut away. The west end of the south aisle was blocked out from the rest of the church, and used as the receptacle for the parish gun, and the interior was crowded with "pens," of the most miserable description, jumbled together without the least regard to ecclesiastical arrangement or decency, the altar table being placed in the centre of the church, all the pews eastward being arranged facing west, and one pew placed against the east wall itself.

The rector, the Rev. George Clement, had long wished to see this state of things at an end, and an appeal to the parish resulted in a meeting being called on the subject; and matters gradually progressed so far, that the professional services of Mr. John Hayward, of Exeter, who has carried out several works of more or less importance in the island, were called in. He made a careful survey of the building, and his plans for the restoration of the church have been carried out, little by little, until the work has been brought at last to a satisfactory conclusion.

Briefly, what has been done is as follows:—The wretched modern porch at the west end of the nave has been removed, and the two ancient doorways at the west end of the north and south aisles are restored to their original uses; the part of the south aisle formerly occupied by the parish gun, is thrown into the church; the two hideous galleries have disappeared; new windows of Early character have taken the place of modern disfigurement at the west end of the nave; and the Flamboyant tracery is restored to the windows on the south side of the church; the chancel has been new vaulted throughout, and extended eastward 8 ft.; a modern excrescence, called the south porch, has given place to one in harmony with the building; the tower, piers, and arches restored, and partially rebuilt; new granite copings and crosses placed on all the gables, the roofs re-tiled throughout, and the vaults and walls re-plastered; the curious internal staircase has also been carefully restored. The seating is entirely new, that of the nave and aisles being of red deal, stained and varnished, and that of the chancel of oak, of somewhat elaborate design; a new pavement of tiles, supplied by Mr. Godwin of Lugwardine, Herefordshire, has been laid down throughout the church, that of the chancel being of rich and varied design; and steps of Devonshire marble have been placed in the sacrarium. The windows, with few exceptions, are filled with stained glass, principally the work of Messrs. Hardman & Co., and are exceedingly good, both in design and colour; two windows, by Messrs. Lavers & Barraud, are equally good; but the same, unfortunately, cannot be said for the east window, the work of a French firm, at Le Mans, which contrasts very unfavourably with the others. These windows are all gifts to the church. The pulpit, the gift of two unknown ladies, is executed in Caen stone, by Mr. Boulton, of Cheltenham, from the architect's drawings. The upper portion is circular on plan, springing from the octagon, and is divided into a series of panels by moulded arches, supported on marble columns, with carved capitals. The panels, which have diapered backgrounds, are filled with statuettes of the four Evangelists, and St. Paul, St. Peter, St. James, and St. Jude, comprising the several writers of the New Testament. The cornice is carved, and is surmounted with a capping of alabaster, the same material being employed for the capping of the open balustrade on each side of the stone steps, which is supported by marble columns. The pulpit rests on an octagonal base of polished red granite, worked in the island. The font, also a gift, is of grey granite, of bold design.

The church will be warmed in winter by the apparatus of Messrs. Haden, of Trowbridge, and lighted at night by paraffine lamps of ornamental design. The organ, placed in the north chancel aisle, is built by Mr. Robson, of London, and is an instrument of considerable power. The case was designed by the architect. The lectern is in the form of an eagle, carved in oak by a native artist.

The general contractor for the work was Mr. Le Sueur, of St. Helier's, but the chancel fittings have been executed by Mr. Blamfield, also of St. Helier's; and the altar-rail, parclose screens, &c., are the work of Messrs. Hart & Co., of London. The execution of the work generally reflects credit on all concerned. The total cost of the restoration will be between 4,300*l.* and 4,500*l.*

Friday, the 5th of August, was the day fixed by the bishop for the re-consecration of the church, this ceremony being rendered necessary in his opinion by the extension of the chancel eastwards. The weather was all that could be wished, and the church was filled long before the appointed hour.

At the conclusion of the service, the bishop, and a large number of the clergy and laity were entertained at luncheon in the school-room by the rector, the Rev. George Clement, to whose unwearied exertions the accomplishment of this great work has been mainly owing. The day will long be remembered by those present with peculiar satisfaction, as commemorating the first instance in the island of the restoration of an ancient church carried out fully and completely.

There can be little doubt that what has been accomplished here will, under God's blessing, do much to improve the state of Church feeling in the island generally, and to pave the way for a similar work in other churches, many of which, fully as interesting as St. Ouen's, have fallen into a sad state of neglect and decay; and the presence of their bishop in the islands, who seems to have won all hearts, during this, his first visit among them, cannot fail of bearing good fruit.

H. B. P.

THE WELLINGTON MONUMENT.

Sir,—In order fully to understand the merits of a case it is generally necessary to begin at the beginning. So far as I know, this has not yet been done in the matter of the Wellington Monument.

The original cause of the delay in the completion of the monument, and of the present money difficulty, is to be found in the award of prizes at the competition of sculptors. This will appear if the history of the work be followed out.

Of all the models sent in, that of Mr. Stevens was the only one which showed such a knowledge of architecture and ornament, united with what is looked upon as purely sculptor's work, as to make it fit for the site chosen in St. Paul's Cathedral. This, I believe, is generally admitted; and, at any rate, the judges knew that a "*pervious*" monument was alone fitted for the site, and that Mr. Stevens's design was the only one answering to that character. Upon what principle the prizes were awarded I do not know. It ought obviously to have been upon that of giving the first prize to the work best suited to the place for which it was designed; and, as every competitor knew where his work was intended to stand, this would have been perfectly fair to all. This principle, however, was not adopted. The bad effects of the first mistake were soon apparent. The first and second prize-holders were commissioned to execute bas-reliefs, simply because they were first and second prize-holders, *and they were paid out of the* 20,000*l. intended for the monument itself*, and to which sum all the designs were originally made.

Thus Mr. Stephens was placed in a false position at the very commencement of his labours; and, as if it were not enough to cut down the price to be paid him, he was also required to erect a full-sized model of the monument, a proceeding both unusual and unnecessary, and which added greatly to his expenses, compelling him to prepare and study expressly for it. That, under these circumstances, Mr. Stevens should have had to take other commissions, is not wonderful. He certainly might have refused the work altogether, but whether he would have been justified in doing so let artists judge. It now remains to be seen whether the country will allow Mr. Stevens to complete the national work at his own cost. If it does, I can only say that it deserves neither the work nor the artist.

G. C. E.

ROADMAKING IN THE METROPOLIS.

A report has been made to the vestry of St. Giles's, Camberwell, by their General Purposes Committee, in which are embodied the results of numerous inquiries on the subject of paving and road-making throughout the leading towns in England and Scotland. With few exceptions it appears that the footways are paved with York or other flag paving. In some cases special kinds of pavement are adopted from the circumstance that the material is to be obtained near at hand. Attention has in many districts been directed to several kinds of composite paving or asphalte, for roads as well as footpaths. Bricks also are specially made for the purpose, and wood has been extensively used for pavements and roadways.

The committee thought it would be advisable to take the material in the parish. Their further recommendations were:—That experiments be made with paving bricks for pathways; that where the leading pathways are wider than 6 ft. (and such as in their opinion from the traffic should be paved with York flags), in such cases the remaining portion of the pathways should be made up with one of the description of asphalte or tar paving; that paving works be done to the extent of 25,000*l.* or 30,000*l.*; that they be at once empowered to contract for paving works to the extent of 2,000*l.* in York flagging, and 1,000*l.* in tar paving or asphalte; and that North-terrace, Camberwell High-road, be paved at once with a 6 ft. course of 2½-inch York flagging, and the remaining portion of the pathway with tar paving. The surveyor, whose opinion is attached, thinks there are many local streets in which the several kinds of asphalte and tar paving could be used with advantage.

On the subject of the use of steam-rollers in repairing roads, the surveyor reported to the committee that he was of opinion that the heavy rollers used crushed and wasted the material, and until further experiments had been made he would not recommend the adoption of the steam-roller. A five-ton horse-roller, at a cost of 90*l*, he thought would be useful. The committee resolved to recommend the purchase of this, asking, however, for power to purchase a steam-roller divided into three five-ton portions, thus reducing the crushing power to which the surveyor had directed their attention, should they deem it advisable. It must be remembered that a heavy one has been in use for some time in Islington, and has at last been purchased by the vestry, and that its results are remarkably satisfactory. The vestry of St. Marylebone has also deserted the horse-roller, and is experimenting with the steam-power.

A Steam Road Rolling Company is announced, with a capital of 5,000*l.*, in shares of 1*l.* each. In a prospectus we are informed that for road maintenance the average of seven estimates shows a reduction over the present system of fully 40 per cent., whilst the saving to the public in wear and tear of horses, vehicles, and harness cannot well be estimated. The system has already been adopted in Liverpool, Sheffield, the London Parks, and Paris, a six years' contract having been lately entered into in the last city at one-half the price formerly paid for horse-rolling. It is estimated that there are upwards of 1,100 miles of unpaved highways in the metropolitan districts alone, and the company propose to take a license for the use of the patent steam road-rolling engines of Messrs. Aveling & Porter and Messrs. Batho & Clark, for which it is believed that remunerative employment can always be found.

Those who take an interest in the subject may advantageously study the report by Mr. Paget, C.E., recently alluded to by us as having been published by order of the Metropolitan Board of Works, on "Steam Road-rolling, with special reference to the Metropolis."

RECLAMATION OF WASTE LAND.

The *Gardeners' Magazine* gives a help to this our pet project:—

From the known we argue to the unknown. This generation has seen enough of the reclamation of land to be well assured that a surface alone is wanted to form the foundation of an agrarian enterprise, that needs only prudent management to make ample returns on the capital necessarily invested in it. We repeat that it is not in the first instance a question of good soil or bad soil, or no soil at all. The better the soil, the better the prospect of success certainly; but, to begin with, a surface is enough, and, that there may be no mistake about our meaning, we will point to Dartmoor as offering surface only, and yet being well adapted to become cultivable land, and in due time make fair returns upon the outlay its conversion would involve. Whittlesea Mere affords one of the finest examples of reclamation in our time. Where the melancholy marshes spread far and wide, feeding only the wild duck and the bittern, magnificent crops of grass, corn, and roots are now annually raised upon the jet-black vegetable soil. This was a good case, and a question of engineering rather than of experiment in agriculture. But take a bad case, that of Salisbury Plain, which has been pronounced again and again by "competent authorities" utterly unfit for any purpose except the pasturage of sheep. Traverse the plain any time between midsummer and October, and see how the "competent authorities" were slightly wanting in prophetic insight. See a piece here and a piece there under the plough, and on these pieces turnips as good as ever were raised on what may be called a second-class soil. Barley, oats, and rye have been grown upon the plain, and on some of the older fields that have had the frequent aid of artificial manures we shall yet see wheat, and the homely scenes that accompany wheat on the land, as homely comforts accompany bread in the household. "The wilderness and the solitary place shall be glad; it shall blossom abundantly, and rejoice even with joy and singing."

OPENING OF A CO-OPERATIVE HALL AT BUXTON.

The new stores of the Buxton Co-operative Society have been opened. According to a report which was read at the opening, the society was formed in January, 1866, by about twenty-two persons. Every obstacle was at first put in their way, and they frequently had to meet in the open air. None of the property owners would let them have a shop for love or money, and at last they gladly accepted a cellar offered to them by one of the members. They now commenced to deal in flour, their capital at this time being about 23*l.*, and more than two tons at a time could not be bought to advantage. Cash had to be paid before the goods were delivered. At the end of 1866, the members only numbered twenty-five, with a capital of 48*l.* In 1867, the old stores in Concert-place were taken by two members, as sufficient confidence was not felt in the general body to let them the premises in the society's name. At the end of that year the members had increased to ninety-three, with a capital of about 300*l.*, doing a business of 40*l.* a week. From this time rapid progress was made, and in the spring of last year it was decided to erect the present building, from plans prepared by Mr. Wm. Newby, of Manchester. The contract was taken by Mr. John Barker, of Burbage, for 1,314*l.* The site is freehold, purchased from the Duke of Devonshire, and contains 500 yards. The cellars, four in number, with the bakehouse, contain an area of about 1,540 ft. The oven is fitted up with Tomlinson's patent apparatus, and bakes twenty stones at one time. On the ground-floor is a shop, 28 ft. square inside, bounded on one side by a house for the shopman; and on the other by a covered archway, and the staircase to the storerooms and office on the first-floor, and to the large room and ante-room on the second-floor. The large room is 46 ft. long by 29 ft. wide, 17 ft. high, and will seat 400 persons. In the ante-room is a fifty-gallon boiler, with water oven. In addition to the contract the fittings have cost 160*l.* Since the removal to the new premises the society's trade has increased upwards of 50 per cent., with every prospect of soon being double. The members also keep increasing, the number now being 205, holding a share capital of upwards of 1,070*l.*, with a reserve fund of 39*l.*, and 15*l.* of an additional fund, towards establishing a reading-room and library. Up to the present time the society has sold goods to the amount of 9,700*l.*, and realised a net profit of more than 600*l.*, after paying all expenses, thus reproducing about two-thirds of the members' capital.

SOUTH-EASTERN RAILWAY: WORKMEN'S TRAINS.

Some time since the South-Eastern Company, of their own motion, put on workmen's trains by which return tickets were issued between Woolwich and any of the London stations, London Bridge, Cannon-street, or Charing-cross, at fares of 4d. for the twenty-two miles. It has been found that about 25 per cent. of those using the trains belong to classes for which they are not intended; and, irrespective of the class of passengers using them, it has been found that these trains do not pay. In relation to compensation in cases of accident to passengers by these trains, in the Acts of the Metropolitan, North London, Great Eastern, London, Chatham, and Dover, and Metropolitan District Companies, the compensation to passengers by workmen's trains is limited to 100*l.* The South-Eastern Company reasonably requested Parliament in their Bill, which passed the late session, to grant them a like limitation, but their request was, for what reason we know not, not complied with. The subject was discussed at the half-yearly meeting of the company held on Thursday, at noon, in the Cannon-street Hotel. Sir Edward W. Watkin, chairman of the company, expressed himself strongly in favour of the continuance of the workmen's trains; but the feeling of the proprietors appeared unanimous against the conveyance of large numbers of passengers at such a very low fare, and with unlimited liability. The matter was left in the hands of the Board, and it may be hoped that the many persons interested may approach the Board of Trade with such a representation as may induce them to grant the South-Eastern Company the comparative indemnity granted to other companies, in the matter of compensation, and thus prevent the trains from being taken off, as they may and probably will be, their continuance being optional on the part of the company.

Sir Edward stated that they had been accused of sending large quantities of contraband of war to the Continent since war had been declared. He did not know that they had done so. They had sent medical stores freely over their line, and had had one offer, before the war was declared, to convey a large quantity of arms. They had intentionally quoted so high a rate that the consignment was not sent over their line. Recently the authorities of Scotland-yard had been instructed by the Home-Office to communicate with them (the South-Eastern Company), respecting a number of very heavy wooden cases labelled "books," which had been sent down the line *en route* for the Continent. The packages were suspected to contain arms, not books. These packages were detained and examined, and found to contain Bibles, not breech-loaders, on their way for distribution in the belligerent armies.

The receipts of the South-Eastern have been less for the last half-year, as compared with the last corresponding half-year, by 2,717*l.*; but the working expenses, without starving the line, have been less by 13,263*l.*, which leaves an increased net profit of 10,546*l.*

A dividend of 3½ per cent. upon ordinary stock has been earned, but it was deemed prudent to declare a dividend at the rate of 2½ per cent. per annum, after providing for loan and preferred stock, and to carry over a balance of 22,996*l.* to the current half-year.

The meeting, which was of a most harmonious character, was concluded by a vote of thanks to Sir Edward Watkin.

COLOUR AND ARCHITECTURE.

Sir,—I have only just seen Mr. Sharpe's letter on "Colour and Architecture" in the *Builder* of the 6th inst. Since my name is mentioned in it, I feel sure that you will allow me to say a few words in reply.

There is much in Mr. Sharpe's letter which will receive a very general assent. No doubt some of the attempts to apply coloured decoration to our churches deserve the epithets "crude and gaudy" which he applies to them: no doubt colour ought not to interfere with architectural form:—and so forth. But when he argues from the abuse against the use of colour in architecture, very few, I apprehend, will follow him. Mr. Sharpe, I feel sure, will readily admit that traces of coeval colour are so very often found in our church restorations that we may safely say that colour was commonly—if not universally—used by the Gothic architects in their churches. I think he will also admit that the men who had sufficient knowledge of the principles of art to produce the "glorious architectural effects," which he so justly eulogises, were little likely to injure those effects by an injudicious application of colour to them. If our modern attempts to colour Gothic churches are not very successful, is it not more likely that it is because we have not yet learnt how to do it, than because it cannot be done?

The use of stained glass windows was part of the ancient system of coloured decoration; we have learnt (after some initiatory failures) how to make and use stained glass as the old architects did, and we now apply it with excellent effect. We are going on to the use of wall-painting, and at present, perhaps, we are in the stage of initiatory failures; but I for one do not doubt that we shall before long achieve equally successful results in this mode of decoration also.

That this success is to be attained by copying old examples I do not say. Some of the fragmentary examples of Mediæval colouring which remain are very perplexing—to me at least; and seem equally to deserve the epithets which Mr. Sharpe bestows on their modern reproductions. It is difficult—to me at least—to imagine how the coloured decoration of a building in which some of these fragments formed a portion could ever have produced a satisfactory effect. But knowing how skilful the old artists were—as their stained glass is enough to prove—in the use of colour, I humbly attribute my difficulty in appreciating these ancient examples of wall-painting entirely to the fragmentary nature of the examples, and to my ignorance of the principles on which the artist worked, and of the design of which this is a portion. I have never advocated the imitation of these ancient fragments; I have, on the contrary, frequently deprecated their restoration or reproduction; but I think that to understand the principles on which the Gothic artists coloured their buildings, is our first step towards a satisfactory revival of the practice.

What I have maintained, and still maintain, is, that every great school of architecture,—Egyptian, Assyrian, Greek, Roman, Byzantine, Gothic,—used decorative colour (and historical painting and sculpture besides) to heighten the effect of its great buildings; and that our modern public buildings are crude, incomplete, and unsatisfactory to the eye and mind, without these aids from the sister arts. What I have advocated, and still advocate, is, that our architects and painters should turn their attention to the subject, and rediscover and establish the principles on which the architect, the sculptor, and the painter ought to combine their work into a grand and harmonious whole.

I rejoice greatly that in St. Paul's Cathedral, at length, the sculptor and painter are to be called in to complete the noble work of which our great architect did his part so long ago. The little which has been already done is enough to

show what a wonderful transformation may be effected in that cold and dingy interior. I rejoice in the anticipation that the decoration of St. Paul's will spread, almost universally, the "fashion" of completing our public buildings, and at the same time create a school of artists capable of doing it worthily.

EDWARD L. CUTTS.

RESTORATION: BURY ST. EDMUNDS.

SIR,—Your correspondent "B. B." claims that St. James's Church, Bury St. Edmunds, is "a fair example of the style" to which it belongs; exactly what I inferred,—a fair example of a style in which detail (of mouldings, &c.) is in general flat, tame, and comparatively ineffective. He is right in preferring the arcade to that of St. Mary's Church adjoining, the plan of the piers in which is exceptionally bad, so much so that, in the absence of documentary evidence, I should question it being earlier than St. James's. As to the new roof over the latter, in the first place, a double hammer-beam roof is about the "heaviest" roof in appearance that could well be devised; secondly, the roof is certainly, archæologically, earlier in style than the substructure, having the usual characteristics of a roof of about the first quarter of the fifteenth century, whereas the substructure is what we usually refer to the last quarter of the same epoch; and, thirdly, every one with an eye for architectural design (as apart from archæology) must perceive that with such a comparatively attenuated arcade, and such a narrow and lofty nave, the eye does not demand the further exaggeration of these proportions by a steep-pitched roof. This is so obvious that I cannot but give credence to a report that the eminent architect who was called in to restore this church fully intended to give it a roof in keeping with the rest of the building, but was overruled, in spite of his urgent representations, by some of those amateur ecclesiologists who manage these matters in country places, and who are as thorns in the side of the luckless architect who has to come in contact with them.

"B. B." must have oddly overlooked the drift of my letter, if he thought it necessary to point out that "a bad style may be tolerated in an old building, but can never be a fitting subject of reproduction in a new work." The whole tenor of my remarks was adverse to the restoration of even bad *parts* of a building, and therefore, *à fortiori*, of a building altogether bad. If such a building falls into decay, sweep it away, and build a better one.

A LOOKER-ON.

BRAEMAR CHURCH.

SIR,—Seeing in a recent issue of the *Builder*, under the head of "Notes from Scotland," a statement relative to Braemar Church, which gives the name of Mr. Robert Lamb, of Darlington, as the architect, I beg to inform you that Mr. Lamb is one of my assistants, and has acted in this, as in other matters, under my instructions.

JOHN ROSS.

ARCHÆOLOGICAL MEETINGS.

Cumberland and Westmoreland Antiquarian and Archæological Society.

A MEETING of the members of this society has been held in the Concert-hall at Kirkby Lonsdale. Although 150 members had been invited by circular to attend the meeting, only fourteen made their appearance. A few ladies were also present. The Rev. J. Simpson read a paper, written by the Rev. Mr. Moore, of Bewcastle, upon the Roman stations in Cumberland, and the paper was ordered to be printed among the transactions of the society. After some conversation respecting the antiquities of Kirkby Lonsdale, the Rev. H. Ware read some notes upon the parish church. Subsequently the members lunched at the Royal Hotel, where preparations had been made for about forty persons, but only about twenty partook of the repast.

Sheffield Architectural and Archæological Society.

The members of this society have made an excursion to South Wingfield Manor House, Derbyshire, to which we recently referred. They were admitted by the courtesy of the Rev. Imanuel Halton, the owner of the estate. The Rev. J. Stacye, the president of the society, read a short paper on the history of South Wingfield or Winfield, sketching the descent of the property from the days of the Domesday survey. Mary Queen of Scots resided at Wingfield for about six months in 1569, and again for a short time in 1584. Tradition says that her apartments were in a range of buildings, now wholly destroyed, standing on the west side of the inner court. It appears from Sir Ralph Sadler's papers, that there were in all 210 gentlemen, yeomen, officers, and soldiers employed in the custody of the Queen at Wingfield, in the month of November, 1584. Her domestic establishment then consisted of five gentlemen, fourteen servitors, three cooks, four boys, three gentlemen's men, six gentlewomen, two wives, ten wenches and children. "The diet of the Queen of Scots on both fishe and fleshe days is said to have been about 16 dishes at both courses, dressed after their awne manner, sometimes more or less as the provision servethe." The Queen and her train are said to have consumed about ten tuns of wine a year. Mr. Stacye described the different portions of the ruins, and the party then inspected them. The afternoon was spent in rambling about the ruins, under the guidance of Mr. Cupit, tenant of the manor farm; and before returning to Sheffield, the party partook of tea at the Peacock Inn, near the railway station.

DOLGELLY MARKET-HALL AND PUBLIC ROOMS.

THIS building, which was opened on Thursday, the 11th inst., has been erected under the superintendence of Mr. W. H. Spaull, architect, of Oswestry, on a very commodious site in the centre of the town, and covers 4,960 super. feet; it contains a general market, 60 ft. by 39 ft., with four shops, kitchen, two bed-rooms, four retiring-rooms; an assembly-room, affording accommodation for 600 persons, with raised orchestra, and a spacious reading-room. The walls are of grey granite, relieved by light limestone dressings and arches.

The contract was taken by Messrs. Humphrey Jones, Rees Owen, and Evan Morris, of Dolgelly.

The total outlay for building, stalls, chairs, gas-fittings, &c., was 2,200*l*.

VERMIN IN NEW HOUSES.

I THINK I can inform your correspondent, "R. W.," of a remedy for the disagreeable visitors of which he complains.

Some years ago a friend of mine came to a country vicarage, an old house, and found the upper rooms swarming with these insects; dozens, I might, perhaps, say hundreds of them might be scraped out from between the floor-boards. He made use of the receipt I give below, which most effectually destroyed them, and he has never been troubled with a single one in the house since. I also was troubled with several in my lodgings at the commencement of the year, but the same mixture has been entirely effectual in removing them all.

The mixture I must tell you is a *deadly poison*.

Spirits of wine, 4 oz.; spirits of turpentine, 4 oz.; white mercury, ½ oz.; camphor, ½ oz. Mix, and apply with brush to infested part.

G. I. C. C.

ST. AUGUSTINE'S CHURCH, HIGHBURY NEW PARK.

MR. HENRY RYDON, of Highbury New Park, deserves more than a word of praise for the liberality which has led him, not merely to present the site for a church, but to build it at his own sole cost, probably nine or ten thousand pounds. Moreover, as a preliminary, Mr. Rydon, some six years ago, put up a temporary iron church and hall, at an expense of nearly 3,000*l*. Some of the parties intrusted think it too much to expect Mr. Rydon to erect two churches at his sole expense within six years, and they are subscribing with the idea of at least defraying the cost of the temporary church, but that has not yet been accomplished. It is hoped that this will be done, and that the spire on the new edifice will be raised also by voluntary contributions.

St. Augustine's was consecrated, a few days ago, by the Bishop of London. It is a spacious and handsome structure of brick, with stone dressings, in the style of the fourteenth century, with the nave divided from the aisles by stone columns and arches; and it has a clearstory. The architects are Messrs. Habershon & Brock, and the contractors, Messrs. Perry & Son, of Stratford.

The organ is divided, one part being on the right, the other on the left, of the chancel; and the movements have the aid of electricity.

The Rev. Gordon Calthrop is the minister.

Mr. Rydon is the owner of most of the land round about, green fields a very few years ago, and now nearly all covered with large houses. The clay which was under the turf is now above it, in the shape of walls.

CHESTER CATHEDRAL.

In a letter to the *Times* Dean Howson says:—The architect's estimate for the complete restoration is 55,500*l*. To this some additions must be made, in consequence of our having discovered that foundations were wanting, and that parts of the walls were in a bad and perplexing condition, so that it would probably be safe to say that the whole will cost 60,000*l*. During the present year very rapid progress has been made in the work of restoration. The exterior of the tower has been entirely renewed. The uncouth structure of comparatively recent construction which used to disfigure the south side of the Lady Chapel is gone. The exterior is restored to its original form and beauty. Windows also of great beauty have been inserted here, and others of a decorated character in the clearstory of the choir. An entirely new roof, covered with lead, is being constructed for the nave; the groining of that part of the church is steadily advancing, as well as its exterior reparation at the west end and throughout the south side. The completion of the whole work may be expected to occupy three years; but, in order that we may make sure of this result, it is necessary that our subscription list should be continuously reinforced. We shall be peculiarly grateful if individual contributors, or separate families, will make themselves responsible each for some distinctive portion of the work, as, for instance, a window, a buttress, or a section of the cloister.

THE ARTIZANS' AND LABOURERS' DWELLINGS ACT.

THE Act empowering vestries and district boards to take down or improve dwellings occupied by working men and their families, which are unfit for human occupation, and for the building and maintenance of better dwellings, has been extensively carried out in the parish of St. Luke. Upwards of fifty houses have been brought under its operation, and the object of the Act successfully accomplished. There has only been one case reported in the parish wherein the owner of premises refused to comply with the orders of the vestry, and intimated his intention of appealing to the Quarter Sessions; but, on further reflection, he deemed it prudent to carry out the order, and has since converted the dwelling-houses into stables. A great deal still remains to be done in this and other eastern parishes, in many of which no action has yet been taken by the vestries or other local authorities, nor have the inhabitants resolved to put the machinery of the Act in motion, so that in these cases the Act is, in reality, inoperative.

CONDITION OF DUBLIN.

THE *Irish Builder* says:—

"The writer in the *Builder* has not yet ceased to pour out his store of censure on 'the powers that be' in our city. In his paper, in Saturday's issue, he fearlessly asserts that 'Dublin is not half cleansed.' He names several districts in which 'corporate *vigilance* can never be detected.' Certain it is that the

'Chiel's amang us, takin' notes,'

and however shrewdly we had previously conceived such to be the case, we are confirmed in our opinion, when the writer tells us,—'We have walked through these quarters, and examined the house property, questioned the dwellers as to their wants, and, during our visit, seen sufficient with our own eyes to justify every word we have written or may write.'

"With respect to his queries as to the railings in front of Old Trinity, and the '*dead wall*' in

College-street, we are happy to inform the writer that, within the past fortnight, the works have been in progress. The blocks of Ballynocken granite for the base are on the ground; the foundations are laid about 10 ft. in. We regret that they have not been laid still nearer the frontage line of the College, and with a lesser curve towards the street."

BUILDINGS FOR EDUCATIONAL PURPOSES AND THE INTERNATIONAL EXHIBITION.

Lieut.-Col. Scott, as secretary, writes thus:

I am directed by her Majesty's Commissioners for the Exhibition of 1851, to transmit the enclosed copy of a letter which has been addressed by them to the honorary secretaries of

The Royal Institute of British Architects,
The Architectural Association,
The Architectural Exhibition, and
The Architectural Museum,

and to state that her Majesty's Commissioners will feel obliged if you will be good enough to cause it to be published in the next impression of the *Builder*.

"Sir,—I am directed by her Majesty's Commissioners for the Exhibition of 1851 to inform you that in their opinion the great interest at present felt in the question of national education, and the fact that educational works and appliances are intended to form a prominent feature of the approaching International Exhibition of 1871, seem to present a suitable occasion for the formation, at the Exhibition, of a large and important collection of models, plans, and elevations of colleges, school buildings, and other edifices designed for educational purposes.

It is therefore the intention of her Majesty's Commissioners to request the Committee of Selection for Architecture to assist them in forming such a collection, by devoting their particular attention to the designs, drawings, and models relating to school buildings which may be submitted to them, and her Majesty's Commissioners have determined to place at their disposal on this occasion, in addition to the amount of space which will be regularly set apart for architectural works at these annual exhibitions, a supplementary allotment, to be specially devoted to plans, drawings, and models of school buildings.

Nothing, then, remains but to secure the co-operation of the architectural profession in this work, and I am therefore directed to ask you to have the kindness to make known to the members of your society the views and intentions of her Majesty's Commissioners on this subject."

THE CHEESEWRING.

Sir,—The propping to which your correspondent, "H. B. W.," alludes, was done last year, by order of the Duchy authorities. It was adopted as a precaution against the danger to which the Cheesewring was exposed, through the foolish practice of rocking the upper beds attempted by many of the visitors. For any other purpose it would have been simply ridiculous.

Time will not allow us to do more at present than repeat our assertion, that the Cheesewring is not endangered by our operations; its security, as far as we are concerned, has been amply provided for.

John Freeman & Sons.

THE GREAT-HORTON FINE ART AND INDUSTRIAL EXHIBITION, BRADFORD.

The Exhibition, which has for some time been in preparation at the New Congregational School, Great Horton, has been formally opened. A large and fashionable company assembled in the large room on the first floor of the building, converted during the exhibition into a picture gallery, the Mayor of Bradford in the chair. A great many ladies of Bradford and the district were present. A choir composed of vocalists and instrumentalists, members of the Bradford Festival Choral Society and others, occupied a large portion of the platform, and opened the proceedings by singing the solo and chorus, "The Marvellous Work."

The exhibition is one of considerable extent. The building in which it is held is well adapted, in the size of its principal apartment, the number of its smaller ones, and in the possession of a long corridor, for the purposes to which it is applied. The principal departments may be described as art collections (including many subdivisions), objects of natural history, objects of vertu, and machinery. Of these departments that of art is the most important.

Vacant Land in the City.—The *City Press* points out that the corporation have at the present time upwards of 40 acres of land in the City, which is vacant and entirely unproductive. The greater part of this land is situate in the neigbourhood of the Holborn Viaduct and the New Meat Market at Smithfield; but there are several plots in much more central positions.

CHURCH-BUILDING NEWS.

Hackney.—The foundation-stone has been laid of a new church for South Hackney. It is to be called Christ Church. The edifice will occupy a space of ground between Victoria Park-road and the angle of Victoria Park. The style will be the Middle Pointed, and the church will consist of nave, side aisles, and chancel. A large window will occupy the western gable, with three-light windows in the chancel, which will be apsidal. No side windows are intended. The walls will be of brick, with stone ashlar work, and the roof open-timbered. In the chancel will be a sedilia. The entrance at the western extremity will show a lofty tower. Three descriptions of stone seem to be employed, —Portland and Bisham stone for the outside, and Bath for the internal ribbed and moulded work, &c. The tower, it is said, will be of Bisham stone; but we think, from an examination of it, it appears altogether too soft and weak for its intended purpose. With tower and spire, the contract price is put down at 4,875*l.*, and the church is to afford accommodation to about 800 people. South Hackney is at present well provided with churches. It has no less than fifteen, although thirty years ago it had but two. Of the architectural character of the churches, however, we cannot speak very highly. The present structure will be erected from the plans of Mr. Wiggington, architect.——The district church of St. Mark, which is situate in the Sandringham-road, has been consecrated by the Bishop of London. There are a vast number of empty houses in the vicinity. The structure is very large, affording accommodation for no less than 1,713 persons, exclusive of the gallery. The ten pillars supporting the edifice are painted a dull chocolate colour picked out with gold, and the bricks are painted blue, red, white, and black. All the windows are stained. The roof is of oak, varnished, and the pews are constructed of the same material. The edifice already has cost 11,000*l.*, exclusive of the site, which was given by Mr. Amhurst. When the incumbency was first offered to Mr. Pilkington, 3,800*l.* were required to pay off the builders, &c., and to render the church fit for consecration; but of that sum 2,952*l.* have been subsequently raised, and there remains at the present time a pressing want of 848*l.* to wipe off the debt. Those figures, however, did not take into account 1,500*l.* for the completion of the tower and spire, and 350*l.* for the purchase of an organ and font, and the cost of schools and parsonage, which sooner or later will have to be built, and subscriptions are earnestly solicited.

Bristol.—An adjourned vestry meeting has been held at St. George's, Easton-in-Gordano, to consider a proposition to take down and rebuild the church for that part of the parish. Since a district church has been built at Pill, it has been found much too large for the population, which numbers about 500 in the whole. It is a very plain-looking building, built on to an old tower, and has sittings for about 800. Most of the vestry people appear to have a great dislike to the pulling down of St. George's Church, as it has only been built between forty and fifty years; and they thought it would do very well for them. Still, no opposition was offered to a resolution to the effect that the church shall be rebuilt in accordance with the plans produced, if the necessary funds can be raised, and the necessary faculty is to be applied for. There is every probability, the local *Times* believes, that the church will be rebuilt in the course of the ensuing year. Plans and specifications were submitted to the meeting. The total cost is about 2,000*l.* It is proposed that the new church shall take the form of a memorial of the late vicar, the Rev. Henry Mirehouse. Altogether, about 1,000*l.* have been promised towards the sum required to rebuild the church.

Dodleston.—It is now more than a year ago since the work of restoring, or almost re-building the parish church of Dodleston was commenced. The sum required for the work was 3,000*l.*, as it was proposed to rebuild the church, with the exception of the tower. Mr. Douglas, of Abbey-square, Chester, was selected as the architect, and he has not departed widely from the features of the old church, which was in the Perpendicular Gothic style. Both the nave and the aisle have been considerably widened, and what was formerly the chapel has been utilised as an organ chamber and vestry. The whole of the tower has been restored, the upper part reconstructed and a polygonal capping or spire added. This part of the work, including the recasting of a bell, and the addition of a new one, together with a new clock, has been carried out as a memorial of the late Dean Anson. The entrance to the edifice is by means of a rather quaint half-timbered porch, on the north side, near the tower. With this exception the material used in the construction is the red sandstone from Handbridge. The roof is open over the nave and aisle, but panelled over the choir and chancel; chocolate and white in the former, and green and gold in the latter, being the predominating colours. The decorative artists who executed this work, and also the Agnus Dei and lettering on the east wall surrounding a stained-glass window, were Messrs. Heaton, Butler, & Bayne, of London. An inscription in the lower part of the window shows that it is in memory of Frederick Anson, D.D., Dean of Chester, and Rector of Dodleston, who died May 8th, 1867, aged 88 years. The Christian ministry furnished the ideal subjects for the artist, Mr. Wailes, of Newcastle. A coloured window at the opposite end, now that the tower is thrown open, would be a desirable addition. The woodwork is of varnished pitch pine, if we except the lectern, which is of oak, and the stalls and pulpit are carved. All the seats, which will accommodate 300 persons, are open, and, we presume, will be free. The passages between them are paved with red and black tiles, and the chancel with encaustic tiles. The churchyard has been extended by slips of ground on the north and the east, and on the south by a much larger piece, which have been given by the Marquis of Westminster; and the same nobleman has defrayed the cost of the wall enclosing the same, as well as the lych-gate through which the churchyard is entered from the village. The cost, exclusive of this, and the tower, was 3,000*l.* Mr. Henry Wigginer, of Chester, was the builder; and Mr. John Harrison, of Chester, contracted for the joiner's work. The edifice has been opened for divine service.

Calverley. — St. Wilfrid's (parish) Church, Calverley, has been restored and re-opened. During the last sixteen months extensive alterations, amounting to a complete restoration, have been in progress at this ancient church. The present restoration was prefaced by the removal of pews, galleries, &c., since which the whole of the roofs have been taken down. That to the nave, which was originally covered with lead, and the only one formed of ancient timbers, has been raised to its original pitch, boarded, felted, and covered with grey slate. The other roofs are entirely new, constructed of Memel timber, and boarded, felted, and slated. Owing to the defective construction of the former chancel roof, the walls had been thrown considerably out of the perpendicular, thus rendering the rebuilding of the chancel imperative. All the old masonry, however, that proved sound has been retained, and the new chancel is an almost exact reproduction of the old one, with the exception that it is lined internally with ashlar instead of rough walling. The aisles of the nave and chancel, which were of recent construction, have been pulled down and extended laterally in order to provide additional accommodation, the east portion of the north aisle being now used as a vestry, and the adjoining bay forming the organ-chamber, screened off from the chancel, &c., by an oak screen. The present porch is new, all traces of the old work having been destroyed; but the doorway into the church is the original one, repaired and rebuilt. In the course of the work it was discovered that the foundations of the nave arcade had been rendered insecure by interments within the church. This has necessitated the taking out of the pillars, the construction of deeper and stronger foundations, and the substitution of new stonework in place of the defective masonry. The walls of the clearstory have been cleaned from plaster, and the stonework pointed. The walling above the nave arches is new, to match the tower walling. The old chancel arch being insecure, a new one of loftier proportions has been substituted. The whole of the seats, stalls, doors, &c., are of oak; and the level of the original floor, sloping from west to east, has been retained. The church is warmed by means of Haden's hot-air apparatus, and the lighting is effected by metal standards, the production of Messrs. Hart, Son, & Peard, of London. The organ has been built by Mr. F. W. Nicholson, Bradford. The east window, with its tracery, has been restored at the cost of Mr. Horsfall and family, of Hornby Grange. The west window is the gift of Mr. and Mrs. Thomas H. Gray, of Calverley, who likewise present the communion-tablets and the oak communion-rails.

The other stained-glass windows, which are in the chancel, are the gifts of the family of the late vicar, the Rev. S. Redhead, of the Rev. A. and Mrs. Brown, the family of Mrs. Sykes, late of Leeds; and a lady, in grateful remembrance of the late Dr. Ramsbottom, of Leeds. The oak for nave roof was given by Mr. Margerison, parish clerk. The church-yard has been levelled throughout. The cost of the works, exclusive of stained glass, has been about 3,600*l*. The contractor was Mr. John Tomlinson, of Leeds. The works have been carried on under the direction of Messrs. Healey, architects, Bradford, by whom the plans of the restoration were prepared.

Books Received.

Sussex Archæological Collections. Published by the Sussex Archæological Society. Vol. xxii. Sussex: G. P. Bacon, High-street, Lewes. 1870.

The volume just now issued by the Sussex Archæological Society, if not one of the best of the very valuable series to which it belongs, a value acknowledged on many occasions in these pages, contains a considerable amount of interesting matter and a number of illustrations of more or less merit, including a portrait of the late Mr. W. H. Blaauw, to whom the society mainly owes its origin. "Notes on Pre-historic Burial in Sussex," by the Rev. Henry Smith, M.A., and an account of a curious mural painting lately discovered in Wisborough Green Church, are valuable. Many, too, will read with interest a memoir by the Rev. Edward Turner, M.A., of Henry Smith, commonly known as "Dog Smith," written with special reference to his Sussex charities. Henry Smith, who died in 1627, gave large sums of money, partly before his death, to various parishes in Sussex, Surrey, and elsewhere, for charitable uses, and mainly "for the settinge of the poore on worke." As he wisely directed that the sum (generally 1,000*l*.) should be expended in the purchase of land, the gross income at the present time must be enormous. For instance, he left 1,000*l*. "to buy lands for perpetuity to redeeme poore captives and prisoners from the Turkish tyrannie." The land purchased with this in Brompton, known as Smith's Charity Estate, and long since covered with houses, already brings in a very large income, which in the course of a few years, as the leases fall in, will become immense. A history of the way in which the various sums left by Smith have increased, and of the manner in which the proceeds are now applied, would be valuable.

To meet the views of members of the Sussex Society who did not join at the commencement, it is proposed, if a sufficient number of names be sent in at once, to reprint vols. ii., iii., and v., at present not attainable.

Mr. Mark Antony Lower announces a new "History of Sussex," certainly long wanted, in two octavo volumes uniform with those of the Archæological Society. We shall be sorry, however, if it be thus restricted. Within such limits it cannot be complete, and it will have the effect of preventing for some time longer the publication of a thoroughly satisfactory history of the county.

Land and Houses: the Investor's Guide to the Purchase of Ground Rents, Houses, &c. By John Parnell, Estate Agent. London: Effingham Wilson. 1870.

The main object of this *brochure* is rather to make personal clients than to instruct fully would-be investors. Still, it does something, and would lead an intending buyer to think for himself, and inquire further. We will not endorse the writer's recommendation of short leaseholds, as "a very good investment," though the hint is given that the amount likely to be required for dilapidations at the end of the lease should be properly estimated; nor can we agree with him in advising that a mortgagee who has lent 2,000*l*. upon freehold houses, producing 180*l*. per annum when let, may safely lend another 500*l*. on the same security, and still have plenty of margin.

Stables and Stable Fittings. London: St. Pancras Ironwork Company. 1870.

As we have recently drawn attention to the stables and loose boxes fitted up as models by this company, at their works, in Old St. Pancras-road, we need only say of the little work before us, that it is a trade book supplementary to those models, and includes a considerable amount of useful information on the subjects of which it treats,—"stables and stable fittings,"—irrespective of the company's special manufactures.

The Practical Solution of the Great Sewage Question, by a Combination of the Irrigation and Precipitating Processes. By William Justyne. John Day. London, 1870.

Reading the first portion of this book, the chief object of it would seem to be to discredit the utilisation of sewage by irrigation, the system being pronounced unprofitable and detrimental to the public health, although there is not at present, at any rate, the least evidence to that effect. Reading further, however, it is found that this is but secondary, the main purpose being to advocate the A B C process, the managers of which are certainly the most indefatigable trumpeters that we have heard for some time. We have no wish to prevent Mr. Justyne, or any other writer, from advocating to the utmost a system of which he may think well, but we do most seriously object to the endeavour, as made in this book, to raise a cry against sewage irrigation on the ground of its spreading cholera and all sorts of dreadful diseases to slay "new hosts of human victims at every variation of the wind," without a tittle of reliable evidence to support the assertions. The hollowness of the cry is shown by the advice, with which the book concludes, that the sewage of towns should be used to irrigate land, but that it should be done through the A B C Company, who would see that the sewage was applied at the right times and in moderate quantities.

Miscellanea.

The New Law on Public Education.—The Act to provide for public elementary education in England and Wales has been issued. There are two sections and five schedules in the statute. The Act is divided into two parts—"Local provision for schools," and "Parliamentary grant,"—and then apportioned under several heads. The new law does not extend to Scotland or Ireland. On the "religious question" there are several regulations not requiring children to attend religious instruction. The Education Department is to make school districts, and provide school accommodation for the children resident in each district. A weekly fee is to be paid by each child attending school, which may be remitted on account of poverty. Free schools may be established. Any sum required to meet a deficiency in the expenses is to be paid out of the local rate. With regard to "attendance at schools," the Education Department may make bye-laws, and require the attendance of children not less than five years nor more than thirteen years of age. No penalty with costs is to exceed 5*s*. After the 31st of March next, no Parliamentary grant is to be made except to a public elementary school. In the schedules annexed to the Act there are rules as to school Boards in the metropolis and elsewhere, with a description of the school districts, and the rating authorities are mentioned in the statute.

The Drainage Question at Ashford.—A fully-attended meeting of the Local Board has been held to decide as to the appointment of an engineer to advise as to the drainage of the town, and the removal of the sewage from the river into which the outfalls at present flow. Letters were read from Mr. Bateman and Mr. Baldwin Latham, stating their charges for plans and reports. The chairman and others were averse to going to the ontlay, believing it to be unnecessary, and that a local engineer or surveyor could prepare a satisfactory plan. It was contended by others that, looking at the fever which had lately prevailed in the town, and the communication from the Sanitary Commissioners, the Government would certainly interfere, and at a very heavy cost to the town, if the sewage were not taken out of the river; and it was further contended that an engineer from a distance, and of large experience, was required to grapple with this matter, as local parties would be more open to personal influences. On a division, it was resolved, by a large majority, to employ Mr. Baldwin Latham; and a committee was appointed to meet that gentleman.

New Hospital at Tamworth Workhouse. The local guardians having determined to erect an entirely new building instructed their surveyor, Mr. N. Joyce, of Stafford, to confer with the Poor-law Board and prepare plans for a suitable building, at a cost not to exceed 1,000*l*. A design prepared by Mr. Joyce, and approved by the Poor-law Board was adopted by the guardians. The building was arranged for twenty-eight beds. On the ground floor, in the centre of the building, are a kitchen and sleeping-room for the nurse, and on the right and left hand sides are day-rooms for male and female patients respectively. Communicating with the day-rooms are sleeping-rooms for those patients who are too infirm to ascend the staircases. On the upper floor are three wards—one for males, one for females, and a third for special cases. To secure perfect ventilation the wards and day-rooms have been placed so that there are windows in opposite sides of each room. The windows have been so arranged that they occupy spaces between the beds, and not in any case over them. All the windows are hung to open both at the top and bottom, but if at any time it should be found impracticable to admit a direct current of air through the windows, fresh air can be admitted by means of iron louvre ventilators fixed near the ceilings. The water-closets are placed in wings projecting from the main building, approached by passages from the landings. These passages, as well as the closets, have windows on each side, so that no effluvia can possibly escape into the wards or day-rooms. Hot and cold water are laid on to supply the lavatories and baths. The work has been completed by Mr. Joseph H. Clarson, at a cost of 998*l*. 14*s*.

Norfolk-street, Strand.—It is only fair on Norfolk-street, Strand, through which an opening is being made to the Embankment, to state that it was not always quite so uninteresting a street as of late years it has appeared. In the *Postman* for January 13, 1698, it is stated:—"On Monday night the Czar of Muscovy arrived from Holland and went directly to the house prepared for him in Norfolk-street, near the waterside." William Penn, the founder of Pennsylvania, lived in Norfolk-street. His circumstances, at a certain period of his life, were so involved that it was not safe for him to go abroad. He chose the house as one from whence he might upon occasion slip out by water. In the entrance to it he had a peeping-hole, through which he could see any person who came to him. One of these, having been made to wait more than a reasonable time, knocked for the servant, when he asked, "Will not thy master see me?" "Friend," answered the servant, "he has seen thee, but he does not like thee." Last, but not least, we learn from the *Spectator* that Sir Roger de Coverley, when in town, put up occasionally in lodgings in Norfolk-street, although he had a house in Soho-square.—*Pall Mall Gazette.*

The New Workhouse at Hertford.—A letter from Messrs. W. Wilds & Sons, architects, was read at the last meeting of the local Guardians, in which they say:—"We have examined every door in the new workhouse, and find very many of the frames and hinges in a very faulty condition, attributable to the wood bricks and lintels, which, although sufficient in number and size, must have been put in wet, or, perhaps, in a wet season (for every inch of rough fir in sight has shrunk). Consequently, the frames and hinges are not firmly held, and in some cases there is a lack of sufficient weight in the wood bricks to resist the leverage of the doors; and the current of air in the corridor and passages, at times very strong, has caused slamming of the doors, thereby aggravating, if not in a great measure producing, these defects. . . . The most inexpensive and effectual remedy to be obtained is a wedging up of the lintels and wood bricks, securing the fittings to the floor, and, above all, fixing a check-spring to prevent the violent jar from the sudden closing of those most exposed to the effect of the wind and most used." The suggestions are to be carried out.

New Markets for Aberystwith. — Two market-halls are in rapid progress of construction in Aberystwith. They have been got up by rival limited liability companies. The memorial stone of the one in Market-street has been recently laid by Colonel Powell, of Nanteos, who has granted a long lease of the site on which the old market stood, which market is to be entirely taken down. The Terrace-road Market is already opened.

Cheap Railway Travelling for Working Men.—At a recent meeting of the Metropolitan Association for Procuring Cheap and Regular Railway Transit for the Working Classes, the chairman, Mr. Dawson, read a number of letters from gentlemen and members of Parliament, expressing cordial approval of the objects of the society. Earl Fortescue said: "One penny per ton per mile is found to be a remunerative charge for the conveyance of coal by railway. A ton weight of men and women—from twelve to eighteen persons, without luggage—load and unload themselves from the train, besides bringing and taking themselves away. Even at the low fares you propose, this ton of intelligence would, on an average of the distance travelled, and their own individual weight, pay at least twice as much as one ton of coal pays at 1d. per mile. In case of accidents the railway companies should only have very moderate claims for compensation to pay—in fact, only enough to keep up a penalty upon carelessness; for each passenger, before he starts, has, by a slight extra payment, the power of insuring, from a well-known company, a good sum for himself or his family in case of accidental injury or death on the journey." There was some conversation as to the future action of the association, especially in reference to the Great Eastern Railway

Damages from Fall of a Grand Stand.—At the Leeds Assizes, in the Crown Court, before Justice Brett, damages have been given for injuries to a woman by the fall of the grand stand at Rotherham, in March, 1869. The defendants were members of a committee, and their defence was that the stand was properly made, but that certain stays and supports had been removed. They also urged that the profits were to be devoted to charitable purposes. The judge referred two questions to the jury, first, did certain persons, without the knowledge of the defendants, remove and carry away some of the struts or supports? secondly, did the stand fall in consequence of the removal of such supports? If they found the first question in the affirmative, then the plaintiff could not recover. If reasonable care and skill were exercised on the part of the defendants, then the plaintiff could not recover. The case seemed to come to this, were there diagonals or were there not? If there were diagonals put the whole length, then the stand was properly constructed; otherwise it was certainly defective. The jury found a verdict for plaintiff, damages 85*l.* Plaintiff had previously offered to accept 70*l.* in full discharge.

A Mechanics' Institute for Hazel Grove, Stockport.—The foundation stone of a Mechanics' Institute has been laid in this village. Mr. J. W. Legh, M.P., of Lyme Park, gave an eligible plot of land for a site in the centre of the village, with the buildings standing thereon. It is situate at the end of Hatherlow-lane, and has a frontage to the Buxton turnpike road of 54 ft. and of 47 ft. in the lane just mentioned. The institution will be of brick, with stone base in a line with the corner-stone, and fire-brick cornice, the windows being arched, and locked in with key-stones. It will be two stories in height, independent of the basement story. On the first floor will be a reading-room, 21 ft. by 30 ft.; a library, 14 ft. square; and two class-rooms, each 21 ft. by 15 ft. Above these is a large lecture-hall, 54 ft. by 30 ft., with convenient ante-rooms. There is a porter's house attached. The building will cost over 1,000*l.*, towards which nearly 400*l.* have yet to be raised. The architect is Mr. Samuel Howard, jun., and the builder Mr. Samuel Howard, sen., both of Disley.

Postponement of the International Working Men's Congress.—In consequence of the war, the General Council of the International Working Men's Association has appealed to the Continental sections to sanction the suspension of the rule which makes it imperative that the annual Congress should meet on the first Monday in September. In their replies the sections are unanimous in stating that, under existing circumstances, the Congress could not be held anywhere at the appointed time, and they authorise the Council to appoint the time and place of meeting according to its judgment. Some are of opinion that the Congress may be held in Paris at no distant date. The meeting of the Fifth Annual Congress is accordingly postponed till earliest opportunity.

Paris.—Messrs. Bacon have published a cheap map of Paris, showing clearly the fortifications, walls, and forts.

Monumental.—A memorial has been erected at Wexford to the memory of the late Mr. John E. Redmont, who expended a fortune in the improvement of that town. He introduced steamship and railway conveyance, reclaimed some thousands of acres from the sea, built the approaches at both ends of the town, and to assist in obtaining a free bridge across the Slaney he contributed 5,000*l.*——A monument, in the form of a Mediæval altar tomb, to the memory of the late Colonel Ferguson, has just been erected on the Castle Hill, in the Raith grounds, near Kirkaldy, in Scotland. It is sculptured in Carrara marble, and was designed and executed by Mr. John Hutchison, R.S.A. The sides and ends of the monument are enriched with quatrefoil panels. Extending over the top, and in relief, is an Early English cross, with the sacred monogram I.H.S. The whole marble rests on a massive plinth in one block of polished red granite.

Fire on Herne Bay Pier.—On Sunday night a fire broke out at the extreme end of the wooden pier, Herne Bay, owing to some cause at present unexplained. A great number of spectators quickly assembled, but, owing to the absence of any person in authority, there was considerable delay before proper measures were adopted for preventing the flames spreading. As soon, however, as some of the officials of the place arrived, a number of men were set to work, and the progress of the fire was effectually stopped. If this accident should have the effect of obtaining attention to the pier generally, it will be a good thing for Herne Bay.

Watering Roads.—Dr. Whitmore, in his Report on the Health of the Parish of St Marylebone, during July last, says,—"During the summer most of our crowded streets have been watered on alternate days with a weak solution of carbolic acid, as has been the custom for the last four years, and there is no doubt that this excellent antiseptic and disinfectant has been very beneficial in a sanitary point of view. The inhabitants of those streets have often expressed satisfaction at the freshness and removal of disagreeable smells which this acid produces, and they regard it as an addition to their comfort."

Statue for Bradford.—At the last meeting of the Bradford Town Council, a letter from Mr. J. B. Philip, the sculptor of the Oastler Monument, was read, announcing that in accordance with a promise which he had made on the occasion of the inauguration of that work, he was now prepared to present to the Corporation, for the purpose of being placed in Peel Park, the model of the statue of King Alfred the Great, recently executed by him for the Houses of Parliament. A resolution was passed, on the motion of Alderman West, seconded by Mr. Broadbent, accepting Mr. Philip's offer with thanks.

A Belfast Sculptor.—Three statues in Carrara marble, by Mr. Shakspere Wood, have been sent to Belfast for exhibition. One is a full size and full length figure of Enid waiting on "the three" in Tennyson's "Idylls of the King." Another is a similar figure of the Elaine of the Idylls. The third is a nearly full-sized nude figure of a young girl, who "cometh forth as a flower." There are also several busts of Belfast people by the same artist, and one of an Italian girl. The *Belfast Newsletter* complains of the treatment of native artists in the province of Ulster.

India.—The Indian newspapers say:—"The Lahore Museum has secured a very fine series of seventeen sculptured heads executed in plaster, all found at Shahka-Dera, supposed to be the ancient Taxila; also a portion of stone entablature, containing a seated figure of Sakya Muni, and another figure standing; and the plans of the projected floating bridge over the Hooghly at Calcutta are nearly completed, and a contractor selected. The rates, fixed by referees, are at present before the Government at Simla for final approval."

Accident at Paddington.—Dr. Hardwicke has held an inquest at Paddington, on the body of John Clampit, a labourer, aged thirty-six years. Deceased, who was in the employ of Messrs. Brown, builders and contractors, was assisting at some works in Chapel-street, Paddington, and while on the scaffold, shifting some boards, incautiously stepped back, where he had just taken a plank, and fell through, a distance of 42 ft. He was immediately taken to the hospital, but expired on the way. Verdict, "Accidental death."

Leyland.—The trustees of the Osbaldeston Charity, Leyland, near Preston, have for some years contemplated the rebuilding of a number of almshouses. On Monday morning last, the senior trustee, Mr. John Eccles, J.P., laid the first brick. The almshouses, six in number, have a good, commanding position, and will be built of brick, with stone dressings, interspersed with blue and white bricks. The architects are Messrs. Myres, Veevers, & Myres; and the builder is Mr. Wm. Alston, all of Preston.

To House Buyers. — Some benevolent individual is advertising at his own cost as follows:—

"BUILT to SELL.—Inspect new Buildings in carcass unplastered. Beware of heavy ground-rents, repairs, short leases, and old materials."

The advice is good, and should be taken.

Oakum for Lint.—A specimen of fine picked oakum, used in London hospitals for lint, has been submitted by Mr. W. H. Pownall, late chairman of the Middlesex Sessions to Lord Lindsay's Committee. It is proposed to employ paupers and criminals in producing it.

TENDERS.

For erection of new Wesleyan Methodist school chapel, Fern-street, Bolton-le-Moors. Mr. Thomas Ormrod, architect. Quantities supplied:—

		Allowed for Old Building.
Thompson	£1,250 0 0	£28 0 0
Dickinson	1,228 0 0	45 0 0
Marsden	1,220 0 0	50 0 0
Donaldson*	1,196 0 0	50 0 0

* Accepted.

For boundary-wall to garden of Dr. Vincent, East Dereham. Mr. Henry Plowman, architect:—

Nelson	£145 0 0
Mayes	140 0 0
Hubbard	133 0 0
Larner	129 15 0
Skipper (accepted)	118 15 0

For the erection of a detached cottage at Rainham, Kent, Mr. J. H. Andrews, architect:—

Miller	£483 0 0
Sampson	460 0 0
Seager	449 0 0

For the erection of house and stables, High-street, New Brompton, Kent, Mr. J. H. Andrews, architect:—

Tozer	£1,490 0 0
Wilkins & Son	1,339 0 0
Gates	1,271 0 0
Hasirick	1,165 0 0
Baxter (accepted)	995 10 0
Reeves	775 0 0

For completion of Nos. 13 and 14, Alma-road, Ponder's-end. Mr. W. A. Murphy, architect:—

Cooper	£320 0 0
Shapley & Webster	320 0 0
George	279 0 0
Wilson	278 0 0
Whittaker	275 0 0
Pierce	273 0 0
Parsons & Tilling	259 0 0
Snowball	256 0 0
Bunce	240 0 0
Warr	219 0 0
Prebble	215 0 0
Blease	207 0 0
Norman	192 0 0

For alterations to six houses in Argyle-place, Tonbridge-street Euston-road, for Mr. Lorant. Mr. James Robert Furniss, architect:—

Matthews	£510 0 0
Ball	330 0 0
Jarman	262 0 0
Taylor, Bros. (accepted)	255 0 0 !

For pulling down and rebuilding a stable in the rear o No. 10, Leighton-road, Kentish-town, for Mr. H. O. Nodes. Mr. James Robert Furniss, architect:—

Fawcett	£355 0 0
Ball	350 0 0
Hailey	334 0 0
Dickens	262 0 0
Taylor, Bros. (accepted)	248 0 0

For three houses in the Abbey-road, St. John's-wood. Mr. W. Todd, architect:—

Ebbs & Sons	£3,479 0 0
Simpson & Son	3,365 0 0
Hackworth & Son	3,360 0 0
Phillips & Sons	3,334 0 0
Longmire & Burge	3,277 0 0
Higgs	3,243 0 0

For new building, corner of the Poultry and Queen Victoria-street, London, for Mr. James Wheeler. Messrs. John & John Belcher, architects. Quantities by Messrs. Franklin & Andrews:—

Lawrence & Sons	£20,130 0 0
Little	19,863 0 0
Higgs	19,625 0 0
Perry, Bros.	19,000 0 0
Brass	18,622 0 0
J. & F. Coleman	18,620 0 0
Mansfield, Price, & Co.	18,528 0 0
Gammon & Sons	18,480 0 0
Conder	18,460 0 0
Rider & Sons	18,433 0 0
Henshaw	17,6[illegible]5 0 0
Myers & Sons	17,449 0 0
Jackson & Shaw	16,552 0 0

For the erection of a villa residence, Park Hill-rise, Addiscombe, for Mr. Easton. Mr. George J. Loe, architect:—

Marriage (accepted)	£1,450 0 0

For house at Walthamstow, for Mr. Wragg. Messrs. John & John Belcher, architects:—

Fox	£1,059 0 0
Deavin	883 0 0
Turner	850 0 0
Reed	811 0 0
Forrest	788 0 0
George	767 0 0
Perry, Brothers (withdrawn)	411 0 0

For timber skeleton tower, Stratford, for Dunn & Squires. Messrs. John & John Belcher, architects:—

Lawrence & Sons	£325 0 0!
J. & F. Coleman	145 0 0
Browne & Robinson	139 0 0!

For the alterations and additions to Messrs. Farmiloe's premises, Rochester-row, Westminster. Mr. T. Mills, architect:—

Knight & Sons	£4,875 0 0
Sharpington & Cole	4,545 0 0
Howard	4,457 0 0
Holland & Hannen	4,400 0 0
Bird	4,350 0 0
Carter	4,297 0 0
Thompson	4,230 0 0
Macey	4,209 0 0
Scrivener & White	4,178 0 0
Jackson & Shaw	4,009 0 0
King & Sons	3,874 0 0
Browne & Robinson	3,850 0 0

For Methodist Free Church, at Plaistow. Mr. F. Boreham, architect:—

		Spire.	Vestry.
Death	£790 0	£22 2	£75 1
Finch	738 7	30 6	78 17
Johnson	652 0	21 0	54 0
Thompson & Son	636 0	26 0	65 0
Bartlett	635 10	19 18	63 5
Dyer	626 0	29 17	59 10
Keepence	625 0	19 10	60 10
Javitt	615 0	25 0	59 0
Powell	580 0	30 10	89 8
Harrop & Goulder	554 0	23 0	61 0

TO CORRESPONDENTS.

M. F. O.—W.—J. W. R.—P. B. H.—D. J. H.—W. P. G.—J. B.—T. O—J. H. A.—J. McD.—H. T.—J. S.—H. P.—T. M.—F. R. W.—. H.—F.—J. C.—N. C. F.—J. H.—J. M.—J. R. F.—F. C. F.

F. W. H. (unable to comply),—Architrave (should study geometry. Both ends are equal).—Young Clerk of Works (yes).—H. A. (in type).—Barnsley (in type).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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The Directors are willing to appoint as Agents persons of good position and character.

31st DECEMBER, 1869.

Claims paid on Life Policies to this date	£816,106
Returned in Abatement of Premiums ditto	600,773
ASSETS.	
Accumulated Fund	£1,290,626
Present Value of Life Premiums	1,309,352
LIABILITIES.	
Present Value of Sums Insured (3,246,547l.)	1,580,800
Present Value of Life Annuities (9,095l. per annum)	65,595

Further details as to the Assets and Liabilities of the Office, may be had on application to the Secretary.

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PARTNERSHIP.—A GENTLEMAN, who was articled in London, and had a practice on or two years, having just returned from the Continent after studying for sixteen months in France, Italy, and Germany, desires to ENTER into PARTNERSHIP with an Architect who has a well-established business.—Address, A. M. Z. Workington House, Upton, E.

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MANAGER—WANTED, by a middle-aged Gentleman, a SITUATION, as above. Is thoroughly and practically acquainted with building, an efficient quantity taker, estimator, and measurer. Highest testimonials given. Provinces not objected to.—Address, SURVEYOR, 25, Thornton-street, Brixton-road, S.W.

PARISH of ST. JOHN, HAMPSTEAD.—SURVEYOR and INSPECTOR of NUISANCES.—Notice is hereby given, that at the Vestry to be held at Hampstead Workhouse, on TUESDAY, the 13th of SEPTEMBER, 1870, at HALF-PAST SEVEN o'clock in the evening, the Vestry will be prepared to receive APPLICATIONS from persons fit and competent to execute the duties of SURVEYOR of PAVEMENTS, ROADS, and LIGHTING, and INSPECTOR of NUISANCES for this parish. Such officer will be required to reside in this parish, and devote his whole time and attention to the duties of his office. He will not be permitted to engage in any other duty or business without the special previous sanction of the Vestry. His age shall not be less than 25 nor more than 45 years, and he must have been engaged in similar duties. The salary will be 300l. per annum, with an annual increase of 25l. until it reaches the maximum sum of 400l. A thorough and practical acquaintance with sewerage, drainage, road-making, paving, and other similar works will be a necessary qualification. The duties can be ascertained on application at the Vestry Clerk's Office, New-end, Hampstead. Written applications for the office in the handwriting of the candidates stating age, with testimonials, must be sent or delivered to the Vestry Clerk, on or before MONDAY, the 12th of SEPTEMBER next, by FOUR o'clock in the afternoon of that day. Notice of the time and place for the attendance of candidates will be given, and no candidate is to attend unless he has received such notice.—By order,

WM. GRIBBLE, Vestry Clerk.

Vestry Offices, Hampstead, 23rd August, 1870.

TO FOREMEN JOINERS.

TRAVELLER WANTED, to push the sale of Wood-cutting Machinery. Preference will be given to one who has been accustomed to the manufacture of joinery by machinery.—Address, stating qualifications, R. M. E. Office of "The Builder."

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WANTED, by a Young Man, a SITUATION in the Office of an Architect. Has had five years experience in good provincial offices. Would prefer an engagement of two or three years. References as to character, &c. forwarded.—Address, W. J. H. Post-office, Rotherham.

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WANTED, immediately, a SITUATION, as ASSISTANT, in an Architect's Office, or as CLERK of WORKS. Has been five years with present employer, to whom reference may be made. Country preferred.—Address, stating salary, to A. M. 17, Westbury-road, Paddington.

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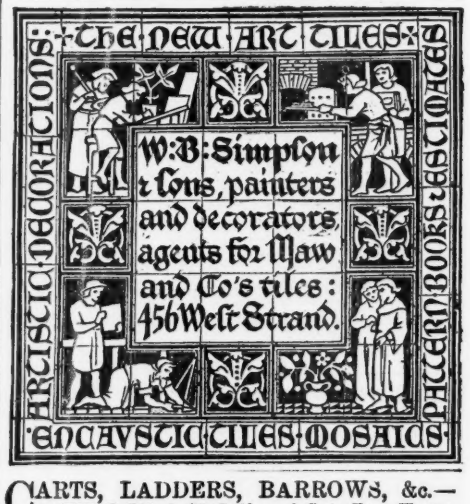
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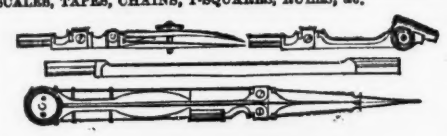

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